*The following three paragraphs are moved from 00:15:15 in the recording:*

*Dewey Livingston:* This is June 25, 2009. This is an oral history interview with Dr. Robert Schmieder who goes by Bob. I'm Dewey Livingston, the interviewer, and Jennifer Stock from the Cordell Bank National Marine Sanctuary is here as well, and first would you spell your name?

*Bob Schmieder:* Well the first name is spelled B-o-b, and the last name Schmieder is S-c-h-m-i-e-d-e-r.

*Livingston:* All right, and this interview is part of a series undertaken by Cordell Bank National Marine Sanctuary, which is part of the National Oceanic and Atmospheric Administration, NOAA.

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Bob, first talk a little about your personal background just briefly, could you please tell about some of your background like your birthplace, date if you're willing, hometown, education even up to that point?

*Schmieder:* Sure. I was born in Phoenix, Arizona, tenth of July, 1941. My dad was a watchmaker from Germany, came to America as an immigrant through Ellis Island, went to Chicago with his two brothers and sister to settle in America, but my dad contracted tuberculosis so he was sent to Arizona to live in a dry environment. The treatment in those days was just complete bed rest in a hot, dry environment, so he lay on his back in a bed for more than a year, year and a half in a TB sanitarium. When he was able he set up a little watch repair business.

My mother was born in Arizona in a little town called Superior, a mining town, and became a schoolteacher, got a college education and started teaching school. She went to China on a trip and her watch got wet, so she asked her older sister how could she get her watch repaired and her older sister happened to know of a good watch repairman, Otto. So Mom brought her watch to Otto the watch repairman and they agreed to have a swimming date the next day, and within three months they were married. I had an older brother three and a half years older than I, name was Carl after the man who had sponsored my father to

come to America, and then I was born in 1941 and we had a sister Linda who was born in 1950 almost ten years after I was born.

So I grew up in Arizona, went to Kenilworth Elementary School, which is on the national record of historical landmark places now, West Phoenix High School and then went away to college and was a visitor in Arizona ever since. So I went first to Occidental College in Los Angeles. There I got a wonderful, wide, broad general education, general arts, and then I transferred over to Cal Tech in Pasadena not too far away because since I can remember, since early childhood, I wanted to be a physicist and Cal Tech was the number one place that I wanted to go to school. I was able to do that, so I graduated with my bachelor's degrees from both Occidental College and Cal Tech simultaneously the same weekend, a Friday and a Saturday graduation.

That summer I got married and then we moved back to New York City where I went to graduate school at Columbia University and I was there for five and a half years. Two of our three children were born in New York City and after the five and a half years I completed all the requirements for the masters and PhD in physics, and then I set about looking for where I could have a career.

*Livingston:* Thank you. Did you have any particular personal interests other than diving when you were younger that might've related to these future experiences that you ended up getting into that we'll talk about?

*Schmieder:* I did a lot of activities as kids do but not a lot related to the exploration except that somehow I got a fascination with exploration in general, in the general sense of the term, meaning you go somewhere and it could be a physical where or it could be an intellectual where, but you go somewhere where people have not been before. It sounds a little like Star Trek, a lot like Star Trek, so this was what motivated me about doing physics because we would discover things. So many areas including physical exploration, geographic exploration, are exactly the

same experience. You want to discover something. This is fun, it's useful, and it certainly is part of my lifestyle both in my scientific work and in the exploration work.

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*Dewey;* Could you tell us about your career and then how it might have influenced or helped your experiences with exploring Cordell Bank?

*Schmieder:* Well my career started I guess when I finished my PhD in Columbia in physics and I went to the Lawrence Berkeley lab as a post-doc, and I had a very great opportunity to do some work in the field of atomic physics using one of the very large accelerators, the linear heavy ion accelerator. This accelerator had been developed by a man named Al Giorso who continues to be a personal friend to this day. He's 93 years old. It was used to discover some of the new elements, the transuranic elements, so it was an extraordinarily exciting physical place to be. Al used the north site of the beam lines and I had the south beam lines, and so what I did in those years together with my advisor of course, I was just a post-doc, was we did experiments to produce new kinds of atoms, not new elements, but these are atoms that have lost a lot of their electrons, maybe lost 20 electrons or so, and they have at the time new and interesting atomic physics properties, x-ray, emission properties and so on, so we were exploring that.

Eventually post-docs run out and you have to get a real job. I spent a year as an instructor in the physics department at Berkeley. That was tough. I had the responsibility for a couple of classes and I discovered then that I really would rather do research than teaching because teaching was way too much work, so then I really wanted to stay at Berkeley as a full-time staff member at Berkeley, but there was a hiring freeze at the time so my best option, and it turned out to be a good one, I looked at the Lawrence Livermore Lab and Sandia National Laboratories and I decided to go to Sandia. I got an offer from there and so I did, and I spent 25 years as a research physicist at Sandia National Laboratories.

*Livingston:* Could you tell us the general point in time that you're talking about when you were in Berkeley?

*Schmieder:* Yeah. I was in Berkeley from 1969 until 1972, so I had been in graduate school from '63 to '69 – actually late '68 when I finished my thesis. '69 through '72 at Berkeley and from '72 onward up until 1997 at Sandia Labs, 25 years at Sandia.

*Livingston:* All right, so you were at Sandia when you were out doing these expeditions.

*Schmieder:* Yes I was, and I can explain how I was able to do this maybe for the first time ever. I'll blow my cover here. We were given at Sandia five weeks of annual vacation in advance. Each fiscal year I suddenly would have five weeks of vacation time that I could spend as I like. I could squirrel it away and use it on weekends here and there or wait until the end and blow it on one big trip, and what I chose to do during all those years was use it in times when I would schedule expeditions, and it was a sufficiently big chunk of time, five weeks, that by being very parsimonious about it and not spending it on other times I could actually plan and then carry out the expeditions and maintain my secure status as a staff member at the lab.

*Livingston:* So while you were working at Sandia or even your Berkeley experiences, were there any inklings in there or experiences you might have had that you could've foreseen that you would've been heading out into the ocean?

*Schmieder:* Yes. There were precursors. Well I'll tell you the moment of my epiphany on this. It was in 1953 when the film *Kon-Tiki* came out as a film in the theaters. This was of course you know the raft project by Thor Heyerdahl and five others from Norway and this film was beyond magic to kids like me. I would've been 12 and I can tell you not only I but thousands of other people have had exactly the same experience. They saw that film and their life was completely changed. Mine was, and I knew from that that I would be deeply interested and very excited about doing that. It was such a romantic image and it's so anachronistic as we came into the second half of the 20th century

to think of people doing exploration and yet here was an event that occurred.

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The ascent of Mt. Everest by Hillary was not nearly as motivating to me partially I think because people climb mountains a lot. You know sort of what the task is. Here Heyerdahl had identified a task, namely to demonstrate the possibility of a migration route for people and therefore the possibility that Oceana could've been populated from South America, not evidence and certainly not certainty, but in a sense this was a much more creative research idea than climbing a mountain, and because of that it appealed to me more because by that time I was already interested in research, whatever the field. In some sense it didn't matter whatever the field just as long as it was research.

So having seen this film in the theater I never again thought that I would do anything else except first of all be a physicist, and secondly be an expeditioner, explorer, but I could make the sequence of getting my education and a job the career of doing physics. I could make that happen. I knew how to do that. I didn't know how to become an explorer so I didn't do much, although now and then I motivated a project. One of them had to do with trying to photograph the very deepest parts of Lake Tahoe. I developed kind of a theory that animals might have fallen into the lake over the course of time and that their bodies would've migrated to the deepest part so there would be this fabulous collection of bones at least, bodies maybe, and they would be rather localized and all you have to do is go down 1,700-1,800 feet and there they are.

Well in those days there were not submersibles and ROV's and deep water camera cases and so on, so I developed a proposal, a plan, and I was not able to carry it out. In fact I got a little bit of pushback from professionals, which I subsequently found is not so uncommon, but that was a precursor and it was an example of sort of trying to get into an activity involving expeditions. There were some other things. I was always wandering off trying to collect something or find something. I would even make a joke and I still do to this day.

Just this past weekend we got kayaks and we paddled into Emerald Bay at Lake Tahoe, so I remarked as usual, "Well this seems to be the first time this place has been visited by white people", which is of course politically incorrect but historically accurate. That's what people said. Of course there were hundreds of boats around there, but you see my attitude. We are discovering a new place. So there were precursors, yes.

*Livingston:* Out of curiosity when you were interested in the bottom of Lake Tahoe and what was there, is that during the time you were in Berkeley?

*Schmieder:* Yeah it was in fact. The idea occurred to me long before that, but by the time I got to Berkeley as a post-doc other than having to deal with raising a family and a house in Walnut Creek, mortgage and so on, I found I had a little bit more time to start thinking about it and so that's when I started trying to do those things. That led around that time, 1971 or so, to getting certified for scuba. Just one day I decided, wow, I actually had a friend who was a scuba diver and he showed me some pictures and I said, "Wow; I can do that and I would like to", so I got certified.

*00:15:15 [Introductory statement moved to beginning of transcript]*

*Livingston:* Now to go on, could you tell about your interest in diving? You mentioned just then a little about it, but before the Cordell experiences, and maybe talk a little about some of the places you dived and activities or projects, something about your diving?

*Schmieder:* Sure. I got certified through a local school called Brawley's Regular School and the tradition and what I did was get checked out in Monterey on the beach down there. Literally thousands and thousands of people went through that and continued to go through similar kinds of programs. There was nothing remarkable about it. It was very exciting to me. I was really motivated and into it because it was satisfying my desire to do something different and challenging that not everyone can do. You know it's a lot easier to be successful at something if you don't have so much competition.

What I have tried to do is identify an area that I could go to, area in general, not necessarily a physical area, where the competition thinks that they don't want to go. That makes it easy. So in learning to dive, that was fun for me and motivating and I was able to start learning about some of the things I was seeing, learning the marine biology, the Latin names of many of the organisms, a little bit about their behavior, what they do. For example certain anemones are very aggressive toward others and we learned that, and I had a lot of fun. Probably 20 times a year, 30 times a year I would go with my buddies. We had a small dive group and we sort of dived together. It was all just plain sport diving. We're going to go up to Monastery Beach, we're going to go up the coast to Salt Point.

Although some did, we didn't dive in San Francisco Bay, sort of default, no real reason for it. The visibility is not good, but the places that we did go were fantastically interesting and eventually I started getting familiar with the environment and then asking a different level question. Not only what am I seeing, but what does this all mean? How is this integrated with the larger picture? Has anybody ever been here before? Are we really the first people to see underwater at Monastery Beach? Of course the literal answer to that is no. The answer for me was of course we're not the first, but there probably are places where we could be the first, and if we are the first in doing something like that we are guaranteed to discover something. This was my imperative from childhood.

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I would be happiest, maybe only happy, when I am in the process of searching for something, discovering something. So as the two or three or four years passed I found that I was pretty much doing the same kinds of things we had done before, but it was not the same thrill to me to just go get abalone, have an abalone feed and say how wonderful this is. It became not unpleasant, just unsatisfying in a longer term, and that's what eventually led to my personal discovery of Cordell Bank and the whole evolution that resulted in the sanctuary designation, and now this wonderful entity that is the Cordell Bank National Marine Sanctuary.

*Livingston:* You mentioned diving Salt Point and places in the Monterey area. Did you dive farther a field, up the coast, down the coast, outside of the state?

*Schmieder:* No, not really. I kind of deliberately did not go off to the standard world class dive places, Red Sea, Cancun, Palau, and so on. Hawaii is not a good place to dive because it's in the doldrums in the Pacific, but I did not partially because I was spending my vacation doing other things and I had a family situation that didn't allow me to just get up and go on trips like that. So I was confined to the coast, and actually I now in retrospect prefer that because the cold water, the water along the California coast in common with some other places in the world is cold and moves a lot, and so it supports this fantastic invertebrate community, and because of that the higher trophic levels. That's what I found interesting and eventually I became really stuck on the invertebrates and the algae and central California coast. Northern California coast was where we founded and where I stayed.

*Livingston:* When did you first hear about the Cordell Bank and what did you learn in those first hearings?

*Schmieder:* Well I remember this so clearly. This process that I just described where I kind of evolved in my diving, I was starting to say is this all there is to diving, namely sport diving, and for many people yes, that's all there is. That's what they want to do. It was not for me. So by that time for about a year, this was in 1977 around that time, I was starting to get a little itchy, looking beyond the sport diving picture and saying, "Is there a project? Could I collect some data for somebody? Could I make a chart or a map or something for somebody? Can I do something that's useful and worthwhile?" Because my day job is as a scientist, this is the process I know. You go somewhere, you observe something, you document it, you preserve it, you write about it, you share it with people and you carry on with that kind of intellectual metabolism, so I was really ready. The event that triggered me was a couple of articles written by a reporter for the *Oakland Tribune*. Fred Garretson, we called him Skip, he was the science reporter and he was a very good one, so he published

a series of semi-expose articles about the radioactive wastes that had been dumped in the ocean near the Farallon Islands, and it led to quite a stink if you like, a public response and eventually governmental response with submersibles to go out and find these drums of waste, and there were inflammatory reports about giant sponges growing on warm drums containing radioactive materials.

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I knew that was all nonsense because I had worked not only at Berkeley where most of the material had come from but also at Livermore, and there's a lot of radioactivity and as a physicist I worked with radioactivity and radio chemistry, so I knew that these were not really dangerous materials and yet there it was. So voila, there is a project. Could I go out as a physicist and a diver? I had the right combination of preparation. Could I as a physicist and a diver go out and shall we say examine these things, document them in some way, collect some data? Then I would be able to make measurements. I knew about instrumentation. I knew about radiation counters. I know about the activity. We could take data, we could analyze it, we could find out if this is a problem or not and that would be a useful thing for me to do. It was a nice project.

That's where I was when I opened the chart to find out exactly where these wastes had been dumped off of the Farallon Islands in three or so places, and completely by shall we say a prepared accident, there were some contours to the northwest with the name of Cordell Bank, one contour of which was a small circle about a quarter of an inch in diameter containing the number 20. So I learned that that meant 20 fathoms or 120 feet was a sounding there, and that clicked because even though I had not yet ever dived to 120 feet I knew that in principle one could make at least one-way trips with scuba to 120 feet and we could maybe even return alive. My attention just shifted. I kind of abandoned Skip Garretson and the *Tribune* and the radioactive waste and I got interested in just asking the generic question, what is Cordell Bank? There must be a lot of knowledge of Cordell Bank at the Cal Academy and I was of course familiar with the academy and even knew some of the staff.

So I started asking questions. The generic question was, "What do you know about Cordell Bank?" and the inevitable answer was either, "Well, um, I don't know, I use Wells Fargo myself;" or if they were a little more savvy they would say, "Yeah, it's this place out there. Nobody knows anything about it. There's no specimens from out there. We don't know anything about it," which was inflammatory to me of course. When I heard comments like, "We don't know anything about it," that was exactly what I was looking for. So the question was, could I turn that kind of a trigger into some kind of a project? The rest we'll elaborate as we talk some more, but that was how it was triggered.

*Livingston:* So you've explained some of our next questions then. At this point then did you immediately have some goals with the idea of exploring the bank?

*Schmieder:* Sure. The reflexive goal was "what's there?" Actually before that was, "what is already known about Cordell Bank?" For a couple of months I went on an odyssey to learn what was known about Cordell Bank. In fact the very first information I got other than "We don't know anything about it" was at the Marin Civic Center in their library, and they had a copy of the *Coast Pilot*. *Coast Pilot* is the handbook for navigating waterways up and down the coast and in waterways. This particular volume of the *Coast Pilot* was written by George Davidson who had been on the west coast since about 1850 and had authored this *Pilot* in the 1850s as multiple successive volumes, and by now they're considered historically valuable, but they've been revised, updated, and abridged so that now you can get a *Coast Pilot*, but it's very utilitarian. In those days in the early volumes it had a lot of descriptive material.

So there I was in the library at the Marin Civic Center and I opened this book and it told me a lot of things about Cordell Bank, roughly where it is, roughly what size it is, and who discovered it: Edward Cordell in 1869. Of course that was like a bolt of lightning. The flash in learning something like that was not only a shocking thrill, but it implied that there was a lot more to be learned because this had been important enough. It was not

a neglected thing. It was something that had somebody's attention, serious attention, long ago albeit, but somebody really cared about this place and therefore from that moment on I really cared about it.

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From that point, that beginning, I then tracked around and started learning lots more about Cordell Bank, but I was only able to go so far with that until I came to the clear realization I would never get satisfaction on how much I wanted to know about Cordell Bank because nobody knew enough about it to satisfy me, and therefore sort of not on one particular moment but sort of emerging in that time was this concept not only must we go to Cordell Bank and find out what's there, but we probably can, but it won't be easy. So then I had a project and I can tell you I was very happy. Sure enough I had a project.

*Livingston:* So please describe in as much detail as you're comfortable with the early planning of this first expedition including your initial research, which you've touched on already, organization of the expedition, any bureaucracy you might have had to deal with, funding, that type of aspect.

*Schmieder:* Yeah, well this actually gives me a chance to put into this record some of the events that happened that I've never had the time/space before to relate, so this is a nice opportunity and I will at this point. I had the idea to go to Cordell Bank, explore it in the old-fashioned traditional sense that Thor Heyerdahl had the idea to do his Kon-Tiki raft trip on the Pacific in the old-fashioned shall we say anachronistic image of an explorer. I could do that because I had a day job as a physicist and I could do this. I could engineer this anyway I liked. That's the way I like to do it in the mold of Heyerdahl.

So my first step after realizing this was to get together with my closest buddy in our small dive group, a bunch of buddies that went sport diving. His name is John Hall. John was more experienced as a scuba diver than I was, so I went to John and I said, "I'd like to go to Cordell Bank. Can you help me figure out how to do it?" in almost those words. So we spent some days examining the project in detail and I learned a lot from John. I'm

going to give John credit for some of the ideas, the actual origin of these ideas, and I'll tell you what they are, but of course I not only grabbed these ideas, but like an amoeba I just incorporated them into my DNA and from then on that was the way the project was in those aspects.

So what John and I talked about was how could we go to this 20-fathom mark in the ocean and dive 120 feet and get back alive? The first thing John said was, "First of all you don't want any beginner divers. You only want people who are experienced and you're going to have to do a lot of practice for this. This is not a dive like we have been doing in our sport diving group where we go to Salt Point for a day and get abalone. This is going to be different." I think I already understood that, so we were in agreement on that.

Another thing he said was the equipment is going to be pretty critical because the depths, 120 feet is beyond the normal sport diving range, therefore we should do the following. The ideas were mostly from John, some from me, but together we came up with things like each diver should do only one dive in a day. We should require a decompression stop regardless. We should design the dives according to the U.S. Navy tables. Each diver should have twin 72 cubic foot tanks or larger. Each diver should have an octopus regulator. Exactly who annunciated those words first or second almost doesn't matter. We were jiggling each other and producing these. A lot of those words came from John's mouth first, but had he not said them I probably would have as well, so that was a joint creative effort.

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As you can tell, those features persisted all the way through the entire program that we did. Those happened within a day or two. So after two or three days of brainstorming with John Hall I felt that I knew enough about the mechanics to project what would be necessary to do an expedition to Cordell Bank and get back not only alive but with specimens and we hoped photographs and so on. I forgot to mention by that time I had interacted with staff at the Cal Academy and they disclaimed having any specimens from Cordell Bank with the one exception of a bag of greenish kind of mud, which G. Dallas Hanna had dredged off the coast in

the 40's I believe. The mud was dried and it turned out to be 100 percent foraminefera so it's a bio sediment, and I was able to examine that, but that was the entire extent of the holdings at the Cal Academy.

The Cal Academy would have been the expected place of record to house specimens and information about Cordell Bank, so having gone through the academy, searched through the academy and found essentially nothing, I knew that we had a valid project. We would not go to a lot of work, come back, and they would say, "Well you could've just gone into that room and found it all." We knew that was not the case.

So back to the preparations, after John and I talked it over I codified it into a plan and the next step I did was I went to a meeting of the Sierra Club Loma Prieta dive section. I was an active member of the Sierra Club. The Loma Prieta chapter had an active dive section so they would go out on sport dives on a regular basis and it was quite a large group of people. They would have monthly meetings. Maybe there were 20-30 people in those meetings and I had been to some, but I didn't go on a regular basis.

Once I had the plan I requested a moment to go to this meeting and announce these plans and solicit divers, so I did. I made a little speech. I showed a map of where Cordell Bank is. I said the target here is 20-fathom mark and judging by the diameter of the circle on this chart it's going to be a quarter of a mile in diameter within the shallower than 20 fathoms. Of course I was stupidly ignorant because 20 fathoms means that there was one place noted at 20 fathoms and it's somewhere within that circle of a quarter mile in diameter, but blissfully and on so many adventures this way, ignorance was a useful tool to me at the time because had I known how tiny that place was and the other places that we subsequently discovered and dived on and documented, I might have said this is going to be too difficult and not rewarding enough.

120 feet down and it's 20 feet across? Are you kidding? 20 miles out? So I benefited, we benefited from the requisite level

of ignorance in starting the project, so from that I picked up a few people who were interested, one in particular Don Dvorak became not only a lifelong participant in the project but a lifelong close, close personal friend and has remained so to this day. From that meeting there were enough people who heard about this project and it was interesting enough that word of mouth was enough to get people flooding me at home with phone calls. "I hear you're going to Cordell Bank. I'm a diver. I'd like to go with you. Which day are you going?"

I had to explain that this was going to be a project. It's not a sport dive. It's a scientific dive. We are not going there to see beautiful things. In fact the predictions, which I know to be wrong, but I wasn't sure how they would be wrong, the predictions were that it would be a pretty boring dive. It's too deep and too dark. In other words I was discouraging people who would call because I knew that most of them were enthusiastic sport divers and that's not what I needed. I needed a patiently prepared and willing to prepare extensively scientifically oriented diver.

Within a couple of months I had quite a list of people and so I contacted a staff member at the Geological Survey in Menlo Park, and he was kind enough to make available one of their meeting rooms in the Survey in Menlo Park, and so I called a meeting as of a certain date, and 40 people including myself showed up. So by that time I had elaborated and focused the plans and the potential problems for doing this. I had been sort of catching wording that I would use, "This is an expedition, this is not a sport dive" and so on, and I basically presented it. I also invited Paul Silva at Berkeley to come and talk about algae. He is one of the world's experts on algae especially on the California coast. He came and talked about what we might find in the way of algae.

A geologist came and talked about what the rocks might be and would we be able to bring back samples of the rocks and who would care. He pointed out that Cordell Bank is part of the Salinian block documenting with samples, Salinia would be useful to the geologists. We had a person who was a bird

mammal observer who talked about the birds and mammals that had been observed. There was a Marin County group that had been out to Cordell Bank and had seen whales and migrating birds.

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So I provided the scientific motivation through these other experts. They didn't have to take my word for it. At the end of that meeting I said, "Okay, let's take a break and talk about it" and then I called people back together and said, "Who wants to do this?" and everybody raised their hand, so I said, "We need a treasury. We need a funding here, so everybody write out a check for $40.00" and everybody did. So we had $40 times 40 or $1,600.00, actually minus one person. One person decided he didn't want to do it so it was 39 times $40, $1,560.00 as a war chest. Foolishly I thought that was enough money and I think we projected to prepare for about two months and then we would do our dives. That meeting was in the summer and we would do our dives in late September, October, which by that time I knew was the right time of the year to do it.

We thought we could do it between July and September to prepare for the first dive at Cordell Bank, and that along with so many other things proved to be wrong. I can follow this on with the details of what took us more than a year to prepare for the first dive.

*Livingston:* To follow up on a couple of things to make it clear, the 40 people that you're talking about expressing interest, were each one of them interested in the actual dive or is this in helping put together the expedition?

*Schmieder:* These were all divers and I think by and large they were all sport divers, but I think they were motivated by the same thing I was motivated. They were sort of through their sport diving experience and looking for a project and that's why they came.

*Livingston:* Could you name the Marin County group that you mentioned? Do you recall?

*Schmieder:* No. There was a small book written about Marin County birds and it was part of a larger group. The Audubon Society carries out their New Years Day counts and I talked with a physician whose name slipped my mind at this moment, but he gave me a copy of his book and told me that there had been birders going out from Bodega Bay to document the birds, so that's when I learned about Bodega Bay as being the port or portal to get to Cordell Bank.

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*Livingston:* Okay, and then stepping even farther back you said you codified it into a plan. Physically what did that plan look like? Was it a page or two of planning or how extensive was it?

*Schmieder:* Yeah. It was not what I came later to write much more extensive documents that look a lot like a business plan. They have background and means and budgets and so on, but it was probably as I recall five or six pages including the charts, where Cordell Bank is, what we expect to be there, and sort of what the project would be like. It was basically a handout description, summary of the project. It was sufficient at the time, subsequently in the other expeditions that I've done that are much more complicated such a small start would be way inadequate, and I've started those expeditions with 100-200 page plans.

*Livingston:* Could you go on then where we left off? Now you had the group. You had some money.

*Schmieder:* Well the next step was to actually see if we were able, capable of doing the dives at Cordell Bank. The very first step for me was making sure that I didn't have any people who thought they wanted to dive at Cordell Bank but were not up to it. Safety was then and has remained the number one controlling aspect of what we do and eventually, I'm very proud that we had a 100 percent perfect safety record. That started at the beginning.

The very first activity we did was we wanted to get used to twin 72 tanks with octopus regulators, which none of us had dived with before, so we talked Marine World Africa U.S.A., which was in Redwood City at the time, into letting us dive in their big

shark tank, and so we carried our new gear. There were a half-dozen of us including Don Dvorak and we also had an underwater communicator, a person who had engineered, developed, and had prototypes of essentially an underwater radio, and it was a radio. It operated with electromagnetic radiation under water, very low frequency so it would propagate at least a few hundred feet.

So we strapped our scuba gear on and these underwater radios and swam around in the tank while people gawked at us through the window and we talked to each other. We came away from that feeling that oh, we were very scientific, we had a lot of technology, we were really getting ready to go on an extraordinary expedition adventure. Following that we decided to start practice dives. It was part of the procedure that John and I and after John was not really involved, he actually didn't participate after the actual planning, John Hall.

We decided to go down to Monterrey and carry out some practice dives, full gear, twin 72 tanks or bigger, octopus regulator and so on to get familiar with each other and to get familiar with the procedures, and so we did, and it was on those practice dives I was able to filter the people who had come to the meeting at the Geological Survey, the 40 of them. Some of them as I expected were really not up to that. They couldn't handle the big tanks. It was too big of a project. People started calling it a mega project because other projects that sport divers knew about had to do with maybe taking films of a certain nudibranchs or something like that, but this clearly was going to become a big task. As people realized that they decided that they weren't really ready for that and they just drifted away.

*00:50:00*

Those that didn't drift away early on, many of them drifted away later off so that as time went on I had fewer and fewer people, so by the time we eventually got to a year later and could carry out the first dive I had only one person from that original group of 40 and that person was me. The attrition was so great. It was quite a lesson in how to start a project and how to take the next step, but by that time I had picked up two or three other people and I felt comfortable about their diving ability and my own ability. I

was a very strong and very skillful diver so I didn't doubt my own ability, and then the other people that I started interacting with and were very energetic and were expedition people in the sense that they would contribute to the planning and the preparation and brainstorming and all that stuff, so it became the project that I wanted it to be but not with the original 40.

*Livingston:* Was there an ideal number or a minimum number that you felt was needed to be able to carry it out?

*Schmieder:* There was a threshold that I would not go below to actually carry out a dive at Cordell Bank and that was five. The reason for that was that the absolute minimum dive team is two people, and I wanted to have two teams so that we could have one team and then another team plus one diver who would be fully suited up as an emergency diver but not be in the water so he would not be cold, he would not be burdened with the need to decompress and so on. He could get into the water and go rescue somebody who was drifting away in the current or something like that. Five was my number. I would not go to Cordell Bank without five or more.

As I approached the first dive I found I had four, and so I was very pessimistic. I had a boat by that time and I can explain how I got that, hired it, but luckily the night before we went to Cordell Bank and actually carried out the first dive, October 20, 1978, I picked up the fifth diver and he was clearly qualified so we went out and did it.

*Livingston:* Was there any regulatory entity that you had to deal with, obtaining permission for instance?

*Schmieder:* Apparently not. I don't remember being as energetic as I would be now to ask permission, but I guess I tacitly assumed that if there was some kind of regulation somebody would let me know, because by that time we had pretty much blown our cover. We were going to Cordell Bank and we had even had publicity about it, a newspaper article, which I can tell you about, before we ever dived. So I didn't run into anyone who said, "You need a permit" or "You need to talk to some official about it." It never

occurred to us that we would need such things. Nowadays things are different of course.

*Livingston:* You obviously were spending more than $1,600.00 by this point.

*Schmieder:* *[Laughs]* Well the budget went down because we spent money on necessary things. I had to reserve some money for the boat that would take us out to Cordell Bank, but I found that we needed more money than that. Actually it's a little tough to remember exactly what it was we spent the money on. I think I felt it was right for us to buy film for the photographers' cameras. I had to buy tapes to do debriefing audio recordings. Those were legitimate expedition expenses and so we kind of dribbled away the budget. By the time we actually carried out the first dive there was no budget left.

Essentially I was supporting it just with my checkbook and getting on with it, but it wasn't too burdensome. By that time the number of people and the scope of it had narrowed considerably. We didn't have the big plans we talked about at that 40-person meeting in July of '77. We just wanted to get to Cordell Bank, dive, and get back, because I knew the threshold for the project was one success no matter how small, non-zero success. So we kind of just winged the budget for a while.

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*Livingston:* I take it that you bought your own gear. The members of the expedition bought their own gear. Things like that weren't being provided by –

*Schmieder:* That's correct. Everybody had to get their own twin 72 tanks and it was kind of tough. The tanks in those days were strapped together with some shaped metal bands. Those were hard to find. The regulators, an octopus regulator just means a second regulator and we required that in case somebody failed, that two people could breathe off of the same tanks. That hardware was already there so all we had to do was buy the gear, but it was everybody's personal expense including myself.

*Livingston:* If you could describe a little more of the planning dealing with safety.

*Schmieder:* As I mentioned safety was number one on our to-do list in the sense that it was a requirement with me that we would do the sanity check. We were not doing this for adventure. People jump out of airplanes for adventure. This is not that. This was a project to go and collect information about a place, so it's an expedition. We joked that it would've been a lot easier if there hadn't been so much water around, we could just walk out there and collect things, but we spent a lot of our energy, a lot of time talking about how we could do this, reducing the risk of injury or death below a level where we could carry out an extended research program and feel reasonably confident that we would not have an incident, send somebody to the hospital or to his death.

So we divided that requirement sort of into two things. One was the equipment and one was the procedures. John Hall and I, John in particular had enunciated at the outset, which I talked about earlier, twin 72 tanks, octopus regulator and so on, and those became the standard inventory of required gear. The procedures were more tricky and we debated those more and in some cases I had to simply define it. I had to override people's adamant statements that "I do it this way." I would override it with something like, "You can do it that way, but we're going to do it this way on Cordell Bank."

Here are some of the examples of the procedures. We decided early on to have only one dive per person each day. You could not do a repetitive dive. That dive had to be designed according to the U.S. Navy tables, which provided decompression schedules, so depending on our bottom time and we could project that, we knew what it was going to be nominally to 150 feet, a bottom time of 15 minutes, which means from the time you leave the surface to the time you leave the bottom. The bottom time for that is 15 minutes and you pay for that with a three-minute decompression stop at 10 feet. All of this you read directly off of the U.S. Navy tables.

Remember there were no dive meters, dive computers at the time. In fact I dived with a man named Bob Hollis who invented

the very first dive computer and on the bottom at Cordell Bank he showed me the very first dive computer in the world, which was an astonishing surprise to me, but as we were planning this there were no dive computers and so here was a procedure that I defined and required. We would have a team of three people. One would be a collector of specimens, one would be a photographer of the collecting of the specimens, and one would be a safety diver who would have no other responsibility than to watch the first two.

*01:00:00*

Team of three is normally a no-no for sport diving because of the danger of three people drifting apart. Two buddies keep track of each other, three is too complicated, but you see the motivation for having three, but then by defining one of those three as the safety diver, that's how I felt that we could assure that we could do a team of three and it would be much more efficient that way. We would get specimens, photographs, and get back alive.

The other parts of the plan involved requiring that decompression stop three minutes or more. You could spend as much time as you want hanging out at 10 feet, so that motivated us and we did produce some hardware. We called it a T-bar. That's common. You hang a pipe 10 feet long down in the water with a T on the end of it and so when the diver comes up he can hang on this. It's supported by an inflatable boat on the surface. He can hang on this bar and make himself negative buoyancy so he's hanging down. There he is at 10 feet. He can hang there as long as he wants while he does his decompression. When he comes back he comes to the surface and indicates he's to be recovered and if all goes well there's a diver suited up in the inflatable right there to take his camera or the specimen bag from him and then to assist him getting his tanks off in the boat and then get the diver into the boat, and that's exactly how we carried it out during almost all of the process.

You can see that for a group that had not operated like this before we had to define this, then we had to convince everybody that they were going to agree to do this, and then in the field what I found was essentially everybody did this. I didn't find people

violating the rules because by then we knew that the stakes were very high. The dangers were high enough that we all did it right.

*Livingston:* You had mentioned doing practice dives at Marine World. Did you do practice dives in the ocean as well?

*Schmieder:* Yeah. In fact we only did that one dive in the tank at Marine World and that was sort of easy and fun and getting involved with people. We did almost all of our practice dives at or near Monastery Beach on Monterey. The reason was there's a place there you can park along the road in the neighborhood, I know the neighbors didn't like it. Walk down to the beach, and within 100 feet you can be down 150 feet in depth, and it was relatively safe, there were always lots of people there so if there were an accident, rescue would be near.

There was a decompression chamber in Monterey, still is, so we had a lot of emergency response capability should something terrible go wrong. In fact nothing ever did go wrong except many of the divers who thought they wanted to dive 250 feet really didn't. If they came out saying, "Oh my god, that was terrible," then I didn't take them to Cordell Bank.

*Livingston:* Today we have detailed documentation of the underwater topography and in your early planning you mentioned that the map turned out to not be exactly what you needed. What was that map and was there any other information you could use?

*Schmieder:* There was only that chart and it was the standard public chart published by NOAA, has a standard number on it and there are charts of all of the U.S. waters. At the time that was the best and the only chart available to us. That was the chart that I saw when I made my personal discovery of Cordell Bank and the piece on that chart was this circle about a quarter of an inch in diameter with the mark 20 fathoms on it. I've said that this was a useful ignorance for us because we had no idea how misleading that chart really was.

It was published according to the procedures. Even now they would put the same kind of marks on the chart, but in those days

there were not the high-resolution survey data we have now with the control of meters. That's all we had and we thought we were aiming for a very big target. This was going to be Disneyland for us. We could wander around as divers. We worked under that assumption in developing our plans, the safety plans and so on, and it wasn't until deep in the preparation process that I started to realize what that really meant, and it was with some horror I must say that there was less understanding and there was now belief that 20 fathoms inside of a quarter-inch diameter circle did not mean there was a quarter mile of shallow water there. Who knows what it was?

*01:05:42*

Of course as we subsequently know it turned out to be, shall we say, miniscule. It drove our planning and as we started to realize how to really interpret that chart, we had to become more serious about how to find such a place and how to establish a descent line to do our diving and it was quite different from the initial concept of just going out and plopping in the middle of this big place.

*Livingston:* Was that something you had to do out on the boat or could you plan for that before you went?

*Schmieder:* It was the latter. As I came to understand how to interpret the chart, what the chart really meant, I essentially changed how our preparations were going, and we started paying attention to how would we find this place, how would we establish a line on such a tiny place as far as to brainstorm and think about what would we do if we couldn't find the place, the place meaning not a huge place but now a tiny place. By the time we actually started going out to Cordell Bank we had that plan in place, and with practice, a year or so of practicing we got pretty good at it. By 2006 when I went with Jean-Michel Cousteau and his team on the dive for the sanctuary programs, I was able to establish the line probably within 15 feet of what I was aiming for, so we got pretty good at it.

*Livingston:* Did you plan to do any specimen collection on the first dive? I know you mentioned the people interested in geology, etc. In this planning session how did you plan for collections?

*Schmieder:* If we had not planned and implemented a way to bring back specimens and/or photographs it would've been a sport dive. It would've been anecdotal science. We would've come back and said, "Wow, that was really gorgeous, wasn't it?" but it would've meant nothing. It would've not been an expedition. It would've been an outing. So collecting specimens was the critical action that we had to accomplish from the outset. Taking photos was also there, but I was really not an underwater photographer. I never got motivated about it. I formed friendships with underwater photographers who were very enthusiastic, but before we saw it for the very first time we didn't really know how photogenic it would be.

Now even in those days I didn't have any concept, any desire to go and take pretty photographs. That's not what we were doing. I didn't care whether they were pretty or not, so to me it wouldn't matter what the photos were, but to the team, especially the photographers, they were interested in subject matter. I was interested in content. These are slightly different. Well maybe I should say appearance. They wanted to come back with wonderful photographs. I wanted to come back with wonderful documents that showed details. This is the difference between a field practitioner using tools that he knows to get things that he wants, which is well-composed, beautiful photographs, and myself, which was to get data. I understand data. That's what my life is about is data.

So from the outset it would've been useless for us to go out there without collecting either or both photographs or specimens. As it happened on the very first dive we didn't have a camera, so we took no photographs, but we did get specimens.

*01:10:00*

*Livingston:* What kind of preparation did it take in order to collect the specimens?

*Schmieder:* Oh my gosh. What an adventure that was! We brainstormed on what kind of collecting apparatus we should develop. We figured that we were so smart we could invent something really

effective, really efficient, and therefore probably a little bit complicated, and we designed it and we actually built stuff. These had plastic bags and they had hinges and they had clips and clasps and tags and signs and invertible pockets and all kinds of stuff. We actually built a bunch of these things and went down to McAbee Beach and other places in Monterey and took these out into the water. By and large the things either disintegrated or tangled into a Gordian mess.

We came out saying, "Well, that thing doesn't work. Let's do something else." We also got involved with a lot of other technology that we thought we could handle as we were planning this. One was these underwater communicators. So we spent some time with the inventor of these underwater radios doing distance tests and we could go 120 feet away and still hear them and so on because we thought that it would be really valuable for us at Cordell Bank to be able to talk to each other. We could say, "Gee whiz, look at that" or something technical of that nature.

Ultimately those proved to be unworkable because we had to trail a 20-foot antenna around in the water with us and we would get tangled up in that. Another piece of technology was a big time lapse camera, 16 mm built into three huge watertight steel containers with a gigantic A frame about the size of a child's swing. We actually went out on a barge in Monterey and deployed this thing on the ground in the water at about 30 feet depth. It ran 24 hours taking one photograph every minute, so we came back with 16 mm footage that showed nudibranchs waltzing across the field of view and an octopus flashing in and out and algae waving around and it was really wonderful, but then I realized are we gonna carry this stuff to Cordell Bank and deploy this at 120, 150 foot depth?

The fellow who developed this was pretty much of a walking disaster by that time. He was brilliant, but he was clumsy in both his actions and his plans, and there came a point where I said, "Sorry. We can't use this. We are not prepared to use this." The same was true of those fancy collecting bags, so what we ultimately fell back on was the standard diver's canvas goody

bag and a garden trowel and that's what we used forever, nothing more complicated than that.

*Livingston:* On this subject let's close it out by asking if there's anything you think could be addressed in this subject. We're just about to get to the first dive. Is there anything that we might be leaving out?

*Schmieder:* Would you like to know how I found the first boat that would take us out to Cordell Bank? 'Cause this was part of the planning. I went up to Bodega Bay after I learned about Bodega Bay. I found out that fishing boats went out to Bodega Bay on any days they had clients and weather permitting, and they would go out to Cordell Bank. They called it Cordell Banks. In fact even today most people call it Cordell Banks, which is colloquial. I consider it slang and I can't tell you how many people I have helped to understand that we say Cordell Bank, but I found several people up at Bodega Bay who said they'd take us out to the banks and sure they knew their way around and they'd take our divers and we were fine.

It was only one, Mike Craine who had a very tiny fishing boat called the *Mariner,* little black boat, and he went out once in a while outside. I think he had been to Cordell Bank once before, but he kind of cleverly and usefully hid that from me. So he and I stood on his boat in the harbor there in Bodega Bay and talked about the project and he agreed to do it and we agreed on price. I think it as $275.00 to take us all the way out to Cordell Bank and back with my team of what I thought at the time was 15 divers or so, lunch included.

*01:15:15*

So as time went on, as our plans sort of lurched forward and downward, Mike Craine was the constant in that. The boat was available, and in fact when we finally succeeded almost a year later it was on *The Mariner* with Mike Craine at the wheel to take us on our very first dive. He and I went out on the boat six weeks earlier on a survey cruise to see if we could find that 20-fathom place, by which time I was alerted and understood that it may take some searching. So Mike and I and his wife went out just the three of us and we searched for many, many hours, a lot of frustration, couldn't find the 20-fathom mark, and I began to

think, "Oh my god, what hath I wrought?" His wife blew Mike's cover by saying, "Dear, you were able to find it the other time you were here on the bank" and I kept quiet because I thought, wait a minute, he said he knew Cordell Bank like the back of his hand, been here many times.

It was okay. Eventually about 4:00 in the afternoon we found the 20-fathom mark and I threw out a small anchor with a thin piece of fishing line and a capped empty bleach bottle as a float thinking we found it. When we come back to dive we know exactly where to come, and I went back to my team and said, "It's marked. We know exactly where to go," not knowing how foolish, how stupid that was ultimately. When we talk about the first dive we made I'll elaborate on why that was so silly, but that's how I got to Cordell Bank the very first time and then eventually six weeks later with Mike on our first dive.

*Livingston:* One more thing before we break. Did you know of any other expeditions in the United States on the coasts, even in the world, that you could compare notes with around the time you were doing it or in the not too distant past?

*Schmieder:* No I didn't, and that's primarily because I didn't look. First of all I was pretty busy figuring out our own project. Secondly I really didn't need anybody else, although in retrospect that seems very arrogant. Nowadays I wouldn't be nearly as arrogant to think that I could invent the whole thing myself. I knew of some projects and in fact there was a kelp forest monitoring program on the Channel Islands and I participated in that. I went down and dived with them and did the kind of volunteer work that I fancied we were going to do with Cordell Bank. The difference compared to that project was that project was a systematic long-term study and I knew at Cordell Bank this was going to be opportunistic. We would not have the ability to come back to the same place on anything like a schedule.

We may see many places only once, forever, so this was going to be an opportunistic grab-sample kind of expedition and because of that the control would not be take samples or at even intervals or at even times or controls like that, but it would be how much

diversity would we be able to go for. This is counter to the goal of many expeditions, maybe most, or projects that on the surface may seem similar like that kelp monitoring project. Cordell Bank was not going to be that way. It was going to be in a sense jump in, mixing verbs here, jump in, grab what you can grab and get out, sort of like that supermarket game. You run in and you've got five minutes to grab whatever you can grab and then you get out.

That's what we were going to do. I didn't need anybody's model, and in fact I found myself in conflict with professional scientists who advised me that I'm going about this the wrong way and that I need to lay out transect lines and take samples at even intervals and they simply didn't understand the difficulty of what we were about to do. I did, so that's how I went ahead and designed it without anybody's help, with my team of course.

*[01:20:18, end of audio file 1. Begin audio file "CBNMS Schmieder 2" at 00:00:00]*

*Livingston:* This is the beginning of the afternoon segment, interviewing Bob Schmieder. We're going to be talking about the first dive in October 1978.

First of all, could you name the people who were on that first dive?

*Schmieder:* Yes, I could name them. They were myself, there was Steve Lawler, there was Larry Pfoutz, there was Dannie Baxter, who is a woman….

Well, so as the project progressed – we had to go through the winter of 1977 and then the spring. And we started doing practice dives in preparation for actually going to Cordell Bank.

One of the practice dives we did was out to the Farallon Islands. And we took the assistant to Paul Silva who's the algologist at the herbarium in Berkeley. Dick Moe, Richard Moe, was just finishing, or had finished his PhD in algology. So he went with us on a practice dive out to the Farallones. And we dived to 150 feet, about a mile to the east of the southeast Farallon in a dive that I

probably would not do today because we had no knowledge of the Great White Shark population out there.

And this was in August or September just about the time when the sharks, as we now know, are returning to the island to feed on the elephant seal pups.

But in that dive not only did we carry out tests of the equipment and under field conditions, that is, not practice dives at Monterey anymore, but actually out in the ocean to the right depth with the right decompression schedule and so on. But we succeeded in collecting a bag of specimens and all the algae went with Dick Moe to Berkeley to the Herbarium.

And I subsequently learned that this was the first collection of subtitle algae ever done at the Farallones. So that gave us a jolt, a scientific inspirational motivational jolt that we not only could do field science, but we were doing it.

And that really spurred us on. And I got very much more energetic and enthusiastic and confident that we could do this. By that time the team had dwindled to Don Dvorak, who had started at the beginning, Steve Lawler who'd become a central team member and a shall we say strategist in this, Dannie Baxter, a woman from Marin County who was a sport diver and a photographer – underwater photographer, Larry Pfoutz who had been a friend of Don Dvorak, tall lanky, strong diver.

And so we had about four people at that point, but my minimum was five and so we went through for a month or so with not enough people, and I was feeling very impoverished, even despairing, that we may not actually go to Cordell Bank and go diving.

I think we only had four divers when we went to the Farallones, but to Cordell Bank my requirement was five.

So, I was searching for divers, but the time was running out because I needed to practice dives with them and make sure that

they understood what it was we were trying to do, safety demanded that.

So with some maybe unwarranted confidence I scheduled the boat, *The Mariner,* in Bodega Bay, and we planned to go out. And I said to the small group, "We're gonna go out there even if we can't go diving. If we have just four people we're gonna go out there and we're gonna look at the water because we're going to Cordell Bank. We have to do that. Otherwise, this project is dying from starvation."

So just the day before we were scheduled to go, which would have been October 19, 1978, one of the team members, I think it was Dannie Baxter, said, "I have a friend who's a good competent diver. I will vouch for him. His name is Don Griffin."

And I talked to Don on the phone and he gave me enough confidence that he would not only be a good strong diver, but he would be willing to play any role on this project that I wished him to do.

*00:05:40*

And I said, "That's fine. I will establish you to be our safety diver. I will have two teams of two and you may or may not be able to go to the bottom, actually dive, but if you will function as the safety diver I will be grateful and I would be pleased and you can go out with us."

On that basis, with those five people, including myself, we went up to Bodega Bay and got on Mike Craine's boat, *The Mariner,* and we went out to Cordell Bank.

And we searched like we had done six weeks before when Mike's wife had indicated that he had been there once before. We searched here and we searched there. Our navigation consisted of a LORAN-A receiver. That preceded LORAN-C.

LORAN-C could locate you within a few hundred yards or so, or at least could return you to the same kind of a point. LORAN-A was an old radio receiver that you turned a dial on to make a little

squiggly signal showing on a display tube about 2 inches in diameter.

You turned the knob until that display sort of intersects itself. Then you read on the dial, then you consult some numbers on a table and that tells you where you are within plus and minus one mile.

But on that day the second channel – to locate yourself you need two coordinates, latitude and longitude – so on that day one of the channels was not working. So we knew where we were on Cordell Bank within plus and minus one mile north and south and plus and minus infinity east and west.

So we spent many hours that day surveying – that's a nice technical term – we were wandering about hoping to find Cordell Bank. And we kept saying to ourselves, "Holy cow, this place is huge, it's four miles wide and nine miles long." We can't even find Cordell Bank much less find this quarter mile diameter that we thought divable area where it says 20 fathoms. We couldn't find anything. It was all way too deep for us to dive.

And we were even speculating about having to go back. And so I was saying, "Well, at least we got here. We think we're on Cordell Bank," and so on. And then I remembered how Edward Cordell had found Cordell Bank. He looked around and he saw a whole bunch of seabirds over on the water *over there*, and he went *over there*. And after hours of frustrating unproductive searching right where the birds were was where the shallow water was.

So I said, "Mike, look there are a bunch of birds over there. Why don't we go over there and look?" And sure enough that's – bingo, we got 20 fathoms, pulled up that 20 fathom mark just like that.

So when we got that we scrambled and dropped the descent line, not as precisely as we later learned to do it, but we dropped it somewhere in the vicinity of that 20 fathom mark, and from that point on we knew we were able or probably going to be able to carry out what would be the very first dive on Cordell Bank.

*Livingston:* Now, this is jumping back just a little bit, but how did you feel as you approached that day of the first dive that had been scheduled? What was going on inside the day or two before?

*Schmieder:* The day before, until I got the fifth diver, Don Griffin, was very disheartening to me, very frustrating. I kept repeating my own mantra to myself, "We never give up."

*00:09:56*

And yet there I was so close to feeling like this turned out to be too hard to do. And then I would say, "Am I gonna explain to all these people that I gave up after all this?"

And then we found Don and I had the fifth diver. So I had enough breaths of air there to get me through 18 hours. It was a very tentative time. I was very worried that we didn't have, you know, that we would be frustrated. That is, we would be unsuccessful because of another factor.

There would be – a car would break down, or we would – Mike Craine would be sick. We would forget to bring our dive gear. Somebody wouldn't show up. You know, some reason that would frustrate us.

After all, over that year, especially toward the summer and fall, we had scheduled boat trips out to Cordell Bank eighteen times and probably half of those times we came up to Bodega Bay and loaded all of our dive gear, our twin tanks and our wetsuits and everything in order to go out to Cordell Bank, only to either decide not to even leave the harbor, or we would go out, go around the corner, it would be rolling big waves and we would turn around and come back, eighteen times.

*Livingston:* So those eighteen times though you had planned to dive those days?

*Schmieder:* Eighteen times we thought we were going to be going diving. But we didn't succeed on any of those. And so on this particular time that you're asking about, when it looked like yet again we were on the verge it was yet again a time to go up to Bodega Bay and load the boat, without really knowing whether we were going to

succeed in getting out of the harbor, much less going out to Cordell Bank, even less than that, succeed in diving.

But I knew at that time, that this was opportunistic. If we weren't there, if we said, "Well, on the average we can't do this." Then we would never do it.

It had to be the exception that would allow us to do it. And that's how it happened in the end.

*Livingston:* Describe the weather and sea conditions that day.

*Schmieder:* In retrospect it turns out to be rather typical. We were inexperienced at the time, so we couldn't really – this is partially why it cost us so many unsuccessful attempts. You go out of the harbor and there seems to be a fair amount of surface energy, you know, waves and things, sometimes big rollers right out of Bodega Bay.

If you're faint of heart you turn around and you say, "It's gonna be too rough." But what we learned eventually, and what happened on that particular day, October 22nd. We went out through that rough water and then it became clear and calm.

And from about 5 miles out all the way to Cordell Bank and all day long it was as flat calm as we ever saw it subsequently. It was one of these ripples-on-the-water day.

So we were blessed with that. It was a good time to have no problems. You know, I codified that into Bob's Law About Miracles of, "When you need a miracle, there's one available." There was one that day.

And now that I think about it I want to make sure that in the record it's correct that our first dive was October 22, not 20th. I often confuse that because it was George Davidson who discovered Cordell Bank on October 20, 1854. We were on October 22.

*Livingston:* How about the atmospheric conditions that day?

*Schmieder:* Totally calm and beautiful. I don't remember any clouds. I don't think there were any clouds. There were a lot of birds. There was not enough waves on the water to remark about. There were not even little wavelets. It was enough to see ripples expand from the birds bobbing on the surface.

*Livingston:* A little bit on the onshore preparation whether it be the day before or the day you drive with all your equipment to the boat. What did that entail, loading up the boat? What did you have to be sure to bring?

*Schmieder:* Nothing remarkable. You know, every diver does this; he gets his dive gear together. And so he has a dive bag. I had a dive bag at the time, and you put your wet suit in it, your weight belt you put around your waist and load it in the car.

That's basically it. The photographers have to keep track of their cameras. I did bring goodie bags and tablets and clipboards for writing notes and camera for top side pictures and so on. But it was unremarkable, except for the fact that we had twin 72 cubic foot tanks or bigger and I used twin 80 foot aluminums, and these were big and heavy. And so it meant carrying a lot of gear.

*Livingston:* Now you found conditions right out there. What about that marker you had left before?

*Schmieder:* *[Laughs]* We were so naïve. Perhaps that marker lasted a day. Cordell Bank is not exactly on the main shipping channel, but it's not so far and we have been diving, we had diving operations underway when a great big container ship goes smack across the top of Cordell Bank.

And on occasions like that we would panic and we would get on the radio and we would fly flags and all try and get their attention because the nightmare would be that this ship would just run over us and kill us all which happens now and then out there. We all remember the *Jack Jr.,* a fishing ship, that was killed by an anonymous vessel.

So knowing that now, the idea of leaving a marker out there, especially such a flimsy one as I put out there, is beyond silly and almost the kind of thing you don't want to confess.

But here I've confessed it. So, of course, that marker was not there, long since swept away either by vessels or just by the sea itself.

*Livingston:* You did look for it as you were heading out?

*00:17:00*

*Schmieder:* Oh, we looked for it and looked for it and looked for it and wondered why it is it's not there. But, of course, now we would be a lot more calm about that whole thing.

*Livingston:* Now, you're ready to dive and you dive. Could you tell the overall story, maybe blow by blow, you're ready to dive and this first dive? Who went down, things like that.

*Schmieder:* Yeah, well, and a good part of this I've never told because these are some details that I usually don't have the time to tell these details.

After probably three hours this got to be maybe 2:00 or 3:00 in the afternoon, it was more than three hours of searching for the shallow place, maybe it was 2:30 or so. And we finally hit the shallow 20 fathom mark on the sounder, threw the line in with a buoy.

We didn't have what we subsequently required, which was a live inflatable boat on the descent line with a safety diver suited up in that boat. So Don [Griffin] did suit up and – to play his role, which he did, as the safety diver, but he stayed on board.

So as soon as we got the line down we decided – okay, I said, "Stop, let's assess the conditions, let's look at the current, see if we can actually go diving." Just then the fog rolled in and it was zero visibility. Where that fog came from, I haven't the slightest idea. But we were in soup. We didn't have visibility the length of the boat, which was probably 38 feet.

And I wasn't gonna dive in zero surface visibility. What if a diver floated away? And there was a good chance of that. We didn't know what the currents were like. What if a diver came up not on the line, away from the boat? He couldn't be heard and he couldn't be seen. So it's absolutely not diving, period.

So we waited, and pretty soon the fog became patchy. I think we waited a half an hour or so. It became patchy and then I had to make a decision, is it clearing enough so that we can prepare to dive?

And it seemed to be, so I decided, "Okay, let's get suited up and be ready if the conditions are good enough." So Larry Pfoutz and I got suited up. I decided I would make the first dive.

This was the same decision that Neil Armstrong made when he and Buzz Aldrin had to discuss who would step on the moon first. And Neil Armstrong said, "Well, I will, of course." So I said, "I will make the first dive, of course."

*00:20:10*

So it took us half an hour or so to suit up, and the conditions were fine. We seemed to sense that there was not an awful lot of current, at least on the surface. So it seemed safe to do it.

And so when we were ready I had the boat circle around and Larry and I fell over backwards into the water on Cordell Bank, and then went down.

*Livingston:* And describe going down.

*Schmieder:* First of all, when I went into the water I had an instant rush of realization, "I am in scuba gear getting ready to go down on Cordell Bank." And I think you can appreciate after a year – more than a year, of preparation, talking strategy and so on, the act of actual doing this was what people must feel when – when the astronauts get into a rocket and this thing finally takes off after years, maybe a decade, of preparation.

And I had that rush as I went into the water, and as I sort of got oriented and got to the line. I said, "Holy cow, this is actually going to happen here."

There was not so much current on the surface, everything seemed favorable and I was just very cognizant that, "This moment is happening now," whatever that means.

So I started down the line with Larry. And I think we sort of took turns going down the line. I was ahead, he was ahead. And surprisingly soon I started seeing what I assumed was the bottom. It was sort of this greenish gray opaque cover below me.

And I thought, "How cow, we've done all this and we are at the bottom and it's only 60 feet down and it's mud. And that's all there is. Darn it," or some thought words like that.

So we continued down and as I went down, this gray green blanket started getting texture and a mottled appearance, and then I realized it was shimmering. And then, only then, did I realize I was looking at fish. Somehow I had not been prepared. I had not thought about seeing rockfish. I was used to thinking there are gonna be rockfish, like, lingcod on the bottom.

But I had not actually seen in my previous diving a solid opaque blanket of rockfish. And so I was unprepared to even recognize it. It didn't occur to me these were fish until we got close enough to see here they are shimmering.

And as I approached them I probably was only six feet away or so, maybe even less than that, they started slowly parting, as fish do. They moved very gently and slowly, but of course, you can't come close to them, they know how to keep their distance.

And if you can imagine having an opaque curtain in front of you and then a small hole opens and it widens like an iris, and as that iris opened I saw below me this extraordinarily colorful, exquisitely beautiful, astonishingly bright landscape below me with these colors pink, especially, white, especially, but maybe some other purplish colors.

It was not gray. It was not maybe the fluorescent plastic colors that you see on, you know, traffic markers. It wasn't that bright. But the combination of seeing colors of any kind, and also my mental state, and also probably starting to get a little bit of nitrogen narcosis, which enhances your perception, to me at that time was an astonishing, overwhelming visual experience.

And I had another moment of realization. At that moment, just when I saw that, it was – the moment was, "Holy smokes, I am here, I've seen it. No matter what else I do in my life. I have seen Cordell Bank and I'm the first human to do so." That's what I thought about.

*00:24:58*

And then I had to stop and I just hovered looking at this, looking down at it maybe 30 feet below me, 40 feet. It couldn't have been much more than that. I just hovered there for a while and looked around and looked at sort of the geometry, the pattern of the colors.

I tried to sort of not look at details. I wanted to see sort of the pattern and I was looking around to see this quarter mile wide so called big flat area where we could wander around, which I knew by that time probably was not there.

All I could see was this very narrow ridge below me, and it trailed off into invisible dark depths off to the edges. My peripheral vision at the limit of visibility it was probably 80 feet or 90 feet or so. And it would go out of focus at the limit of that visibility, but everything inside of that was like a jigsaw puzzle of colored pieces.

And that's when I knew that I had been to the proverbial symbolic mountaintop. This had to be the same experience that Hillary had when he stood on the top of Everest, knowing at that moment you have just done it. And anything after this can never change the fact that you've done it. We succeeded, we are here.

It was an exhilarating feeling. So Larry and I slowly drifted toward the bottom and we got to the bottom and I just sort of sat down on the bottom, kneeled on my knees on the bottom. And I

turned to Larry and I moved my hands in and out with this gesture, you know, moving the hands, flexing your elbows back and forth like this. And he did it back to me. This was a statement like, "Do you believe this? Is this incredible or what?" sort of a feeling.

I didn't take an awful lot of time once I got to the bottom to look around, because I immediately became aware that I had very limited time. I forgot that for a moment. I was into this sort of Wonderland, this visual experience.

I wasn't narced so bad. I was clearly conscious, I was clearly lucid. It wasn't that. But I was so overwhelmed with how significant it was. We had worked so long and so hard, and then how rewarding this has turned out to be.

It is not what the biologists had said it would be, dark and cold and deep and uninteresting. It was light and it was colorful and it was fabulously interesting. It was incredibly interesting.

So once that passed, that immediately emotional response, I became aware that I'd better come back with some results or I would be a goat.

So I got my goody bag and trowel and I went around ripping the place up. Of course, you can't do much damage. I didn't feel one bit guilty. And I went around cutting things off and picking things up and putting them in the bag. And I pretty much, maybe half full – a fairly large bag, big chunks of hydrocoral with sponges entwined in it. And all the commensals and obligate commensals that came therewith.

I was not aware of those at that time, but I was aware of collecting big chunks of things, which I did very vigorously. I don't know really what Larry did during that time. I think he circulated around and watched me. He did not have a camera, so we got no photographs from that dive.

And his role basically was safety diver for me, watch me, am I okay or am I in trouble and he was a very strong diver, very responsible, and I felt very secure having him there.

So I went about my business and collected the bag of specimens, watched my bottom timer and when it became time I sort of flattened out and looked downward as I allowed myself to float up. And I watched Cordell Bank sink slowly deeper and deeper, get smaller and smaller features, fewer features until it was hard to distinguish the details that I had just seen.

And I was very aware – I tried very hard to fix that image in my mind. I needed to remember every frame. I wish I had been a movie camera that I could capture every frame. That's what I was trying to do as I slowly backed out of there.

*00:30:12*

And then suddenly the whole place went blank because I had passed through the level of fish, and all I was looking at was this shimmering carpet blanket of fish. And I floated away from them and they too went off into the darkness and the dive was over.

*Livingston:* Getting back up into the boat what were you feeling and thinking?

*Schmieder:* Once you've done a dive like this, the physiological feeling is one of extreme power and vigor and strength. And the reason is you have a lot of nitrogen in your body and oxygen. And so you come out with a lot of exhilaration from deep dives like this.

So I broke the surface, the boat was right there for us, and Don acting as the safety diver was there to take my bag of specimens. And I don't remember what I – yes, I do remember what I said. I said, "You're going to like this." Those were the first words I said, I think. "You're going to like this."

They hauled us out. I don't actually remember the mechanics of getting back into the boat. But there we were and I think I repeated, I said, "You're going to like this. You're just gonna love it."

And I showed them the bag of specimens. We didn't really open it up. I reached in and took out a chunk of hydrocoral and I said, "Look, we got it. We did it," or something to that effect.

And we spent perhaps 10 minutes gloating and gleeing and feeling triumphant. And then I had to decide were we going to put the other team in the water or not. You know, should we go home at this point? Because it would be a risk to put in another dive team. This was not an easy dive, although relative to some of the dives we did, this was a very easy one.

So we watched the conditions. The fog was of great concern. The fog had come and gone. While we were on the bottom the fog had come and gone. They had stuck right close to the descent line.

So as the conditions improved again I decided, "Okay, we'll do the second team in." And I said, "Why don't all three of you go? We are suited up; we will act as your safety divers. All three of you go." Which means Don Griffin, Steve Lawler and Dannie Baxter.

And so they did. And they went in and I waited very anxiously on the surface for them to get back. It was a nominal dive, 15 minute bottom time, and they popped to the surface and had some specimens and I was so triumphant in my feeling.

So we got them back on board. And I have a small story to tell about when they got back on board. Once they were back on board I knew that we had not only done what we said we would do, but we would come back over and over again. I knew that I would becoming back for 10 years exploring and describing this place because one thing that I had not known the previous day, and that was, "Could we do this?" And the answer was now, "Yes, we can do this." So we did.

Would you like me to tell you this little story about the second dive team then? I had given very clear instructions all along that we're not going to collect artifacts. Like, "If you find any fishing gear, and you probably will, we're not gonna collect that stuff," boat anchors, cans, bait boxes, you know? "If it's gold bullion, yes, maybe, but we're not gonna collect artifacts. Please do not waste your time doing that. We are here to get biological specimens."

Ironically, Don Griffin, the fifth diver who joined just the day before had not heard this from me and I somehow failed to convey that to him.

So when Don broke the surface he had in his hand, he said, "Here, can you take this?" And it was an anchor; it was a small, heavy boat anchor. And so we brought it up and we pulled it on board.

*00:35:00*

And then we got the team out of the water, all three of them, and they got all back on board. "Are you okay?" "Yes, I'm okay, everybody's fine." So we're standing around talking about this and I looked at that anchor and I said – and we have this on tape actually, on audio tape, "You're not gonna believe this," I said. And I'm reproducing this verbatim, "That's the anchor I threw out here with a marker line six weeks ago."

And what had happened was when we had our survey crew six weeks earlier and I threw out that flimsy little marker I used the only anchor that I had with me, a little boat anchor, I think it was actually Mike's, threw it – no, I brought it to set out the marker.

Threw it out on this – where we found roughly 20 fathoms, just some place, and we had no knowledge at that time how extensive that place was.

Then when we went back on this first day of diving, I had not told Don to not pick up any anchors, and by the most miraculous coincidence we had dropped our descent line anchor for that dive about 20 feet – 120 feet down, 20 feet away. And not only that but Don, when he saw that, decided to collect it even though I thought that he had known to not collect any artifacts like that.

So I kept that anchor for many, many years and eventually it disintegrated. It was a souvenir for many years. And it was this miraculous – the good luck anchor. We actually brought it out with us on subsequent expeditions as a good luck charm. Not that anybody believed that, but that's what we did.

*Livingston:* Fantastic, that's fantastic. A couple of technical items about the descent line, for instance. How did you set it and was it marked as

you went down? What was your relationship to it when it was set and you went down?

*Schmieder:* Yeah, on that first dive, and it took us a while to figure out that the topography of the bottom is extremely rough, that the pinnacles and ridges are extremely small. So it's almost impossible to put a vessel on top of it and say, "Okay, it's 20 fathoms right here, drop the anchor right here," and have that anchor fall onto the pinnacle.

It normally drifts off somewhere else, the current takes it 100 feet away and it misses completely. And we had plenty of experiences like that where we went down, in fact, the next year 1979, we only did one dive that year. The team of three went down and they found the line – the anchor hanging loose at about 15 feet above the bottom at 205 feet because it had missed the target.

On that particular day, on the first dive, we learned that the ridge, the pinnacle is so tiny that you can't just approximately drop an anchor on it, you will miss it. And this coincidence with the previous anchor is not such a great coincidence because there was no other place 20 fathoms deep anywhere nearby for a mile or two away.

So having succeeded in dropping the anchor on that place, it's not surprising that the first anchor was right there because that's the only shallow place.

Then recognizing from seeing it on that dive, recognizing that these are tiny pinnacles or ridges, and very often they are ridges, so they are kind of long, but they're extremely narrow. What we figured out was if we would first find the coordinates, find the location, record the coordinates on the LORAN, then we would steam the boat up current, transversely across the ridge, drift backward and at the best guess location drop the anchor, it would drift down and hook on the up current side of the ridge, the line would go right up the ridge and across the top.

Now that's a pretty tricky operation, but we made it work. We learned how to do it. So well, as I recalled earlier, when Cousteau and his group and I went out there I set the anchor for them and I

dropped it probably 10 feet from where I – I was very familiar with that particular ridge and I was able to drop it 10 feet from where I wanted to put it.

*00:40:05*

So it's a skill and it's one of the reasons why we were successful in diving there repeatedly. Whereas if somebody went out fresh, like Cousteau had never been there, wouldn't know how to do this. That was the technique that we evolved for hooking onto those tiny ridges, and it worked very well.

We could do it about half the time perfectly about a quarter of the time imperfectly and about a quarter of the time failed totally.

*Livingston:* Now, the descent line, is it marked? And when you're going down and back up, are you attached to it or –

*Schmieder:* Yeah, we had a rule, it was one of our safety rules that you could never go out of sight of the line. Some of the divers would carry a transect line which they would hook on to the anchor, or onto the line somewhere on the bottom, and stretch it out behind them. But the rule was you could never, ever go out of sight of your return line.

In addition, we attached flashing strobes at 10 foot intervals up from the bottom. We attached those before we would put the line down, or in some cases actually the – when the conditions were good and the divers were good they would attach – the first team would attach the strobes on their way down for the other teams.

And it was typically Bill Kruse and Tom Santilena, specifically, who were the strongest divers and they would do that. So on the bottom, why would we need the strobes? It is sort of dark, surprising large amount of ambient light but also when you become narced you can't see things as clearly.

And I have an incident that I could recount for you that involved me. But the strobes were there to be beacons to bring us back, and they actually functioned that way. We were saved – stabilized and saved, by having those flashing strobes at 10 feet for about five or six of those strobes.

*Livingston:* Did the second team for that first day take any photos?

*Schmieder:* No, we didn't have a camera. Ironically Don Griffin had a camera and he was an underwater photographer, he would have loved to. But somehow the word – he was the last person to join the previous day and I guess somehow we had not told him.

One of the other team members, Dannie Baxter had interacted with him and I guess just had not told him to bring his camera. So there we were without a camera.

*Livingston:* Now, there you are out there. Did you – other than the dangers of diving that you were well familiar and prepared about, did you think about ships coming through while you were down? Sharks? Things like that? Was there any sense that there was anybody else out there or any dangers?

*Schmieder:* The team talked a lot about sharks. I didn't get caught up, and I tried to damp off all that talk, not only because it was not productive, but it was a binary decision that everybody had to make. If you don't want to go in the water where there may be sharks, you should not go in the water.

And quite a number of people did not. They didn't stay with the project. Out of the original 40 some of them dropped out telling me, "Well, it's pretty sharky out there. I really don't want to do this."

I took the position that I had talked to the fishermen who go out there and they saw a bunch of blue sharks. They saw blue sharks regularly, but never any Great Whites, never, ever any reports of any Great Whites. And those are the only ones we were worried about.

And the reason for this is that they find their food at the southeast Farallon, that's where the elephant seals haul out and there's nothing for them at Cordell Bank.

So we just didn't talk about sharks much. And eventually we did have an encounter or two. There was an El Niño in 1983, the water was warmer and I was hanging on the decompression line and a very large mako shark came zooming. And they are frightening, those fish. They swim so fast, and they appear out of nothingness because your visibility has no transition. It just goes off into fuzzy nothingness.

And suddenly there's a shark coming at you at high speed and then he gets up two feet from you and veers off. It was a bit unnerving. Other than that, we didn't – over the whole time we were there we never saw any Great White sharks on Cordell Bank.

*00:45:10*

And on the first dive I don't think it ever entered anybody's mind. We were so focused on the fog which might – first of all, finding the place, secondly, the fog that might frustrate the diving, third, the mechanics of the diving, just carrying it out, and then fourth, just the exhilaration at having succeeded.

So I don't think the word "shark" was ever mentioned the first day. It just wasn't in our consciousness.

*Livingston:* Now the divers are back up, this first dive. I assume you head back to Bodega Bay. What was the conversation and the feeling on the boat as you all were heading back?

*Schmieder:* You know, I don't remember that as clearly as I remember some of the events that I've just told you about. What I know habitually we did coming back is we would sit on the stern of the boat and we would kind of stare off at infinity and we would congratulate ourselves for being so good at what we were doing.

And we would talk about future plans, "Well, let's do this every weekend." And, "What are you gonna do with the specimen?" We would bring with us manuals, the keying guides for keying out specimens.

Generally, and I believe on that particular day, I would busy myself with sorting the specimens because I was very aware at how quickly they had to be fixed and protected, preserved.

So what I did as we were coming back on that day and on all other successful dive days is, I emptied the goody bag out on some sort of a surface and we brought with us a whole bunch of jars and formalin and alcohol. And so we went around picking the specimens apart and putting them into appropriate sized jars, adding alcohol for the invertebrates and formalin for the algae, and writing out labels.

Because I had prepared little paper labels on non-disintegrating paper, you write on it with pencil, because the ink washes away. And so by the time we got back to Bodega Bay that entire collection was sorted and labeled in jars. And from that I could then – and I did pass it around to a variety of specialists in various institutions, including the Academy, for whatever they wanted to do with them.

But that was our currency. We essentially had sort of like gone to the moon and collected some rocks and now there's somebody who wants to see those rocks. It wasn't quite as big but we felt at the time that it was almost as important.

*Livingston:* Speaking of rocks, did you bring up a rock?

*Schmieder:* Not on the first dive, that's for sure. I totally underestimated how hard that rock is. Cordell Bank is made of a granite, or a granodiorite. Those are different just because different amounts of minerals, orthoclase, plagioclase, quartz and biotype mica.

What I underestimated was the hardness of this stuff. Well, it's not as if I've never seen granite before. Somehow I had this image I was gonna take my trowel and chip off a nice chunk of rock and pass it to the geologist.

Well, that was sort of like chipping something off of a marble building that you might see with a – are you kidding? This was incredibly hard. So we got no rocks.

And it wasn't until two years later that the Sacto [Sacramento] team, the real strong divers, assembled a pneumatically driven

jackhammer, and all jackhammers are driven pneumatically. They made an underwater jackhammer which they fired with a third scuba tank that one of the guys wore, and they used a jackhammer to chip off a few very small chips of a vulnerable place. And that's all we could get. That's all we ever got because that rock is so hard.

Now, if you're the U.S. Navy or, you know, some big corporation and have resources you can certainly do things differently. But we had no resources to speak of.

*Livingston:* Did you or your friends on board have any experience to compare it with or even physically the place you saw there on the Cordell Bank, did it remind you of other places you had dived or was it unique?

*00:50:27*

*Schmieder:* It was unique. I had never seen anyplace like that, but again, I had only dived up and down the California coast, not to the Red Sea and so on. But I was sufficiently well prepared, and I tried to quantify in my view, I tried to sort of quantify what I was looking at, I tried to fix it as images and try to look at it, not just gaze at it, but look at it.

And I did as well as I think could be expected. It was not like any place I had seen before which doesn't make it, you know, superior in any sense. Because every place in the world is unique and intrinsically just as valuable as any other place.

But it clearly was qualitatively different from places I had seen say at Monterey where you're close to shore and up the coast to Salt Point and so on. This was a different kind of community, and that's one of the reasons I knew that I would come back year after year if I could and explore it.

Because clearly this was counter to what had been predicted by a number of professional marine biologists, different from anything I had seen in some years of sport diving. Just obviously, visually different and therefore worthy of exploring and describing.

*Livingston:* I want to clarify about the crew. There were the five divers, there was the skipper. Anybody else on board?

*Schmieder:* There was my wife at the time, she was on board and took pictures. So we have surface pictures. And there was one other person, I think it might have been the skipper's wife, again. I'm a little vague on that. I'd have to check the record. I think she was on board as she was when we surveyed six weeks before.

*Livingston:* This was Craine who you had gone out with before.

*Schmieder:* Mike Craine.

*Livingston:* Mike Craine.

*Schmieder:* He had the boat, *The Mariner,* in Bodega Bay. I think he subsequently moved into Santa Rosa.

*Livingston:* Now, you returned to shore and packed up your car, I assume, and headed home.

*Schmieder:* Went home, yeah. Not too fancy, just went home.

*Livingston:* So what did you tell people in the days following? And also address the media and what the feeling was as you went back out into the world after this experience.

*Schmieder:* There were several people I keyed in on that I wanted to know – I wanted to hear, I wanted to tell them right away, and I was very keen on the following. First I called my dear mother and father and said, "I've done it." "Wonderful, we're so happy for you." That sort of family connection. That was number one.

Number two was, I called and I believe I left a message for Skip Garretson at the *Oakland Tribune,* that we had finally succeeded in diving on Cordell Bank and we had specimens. And I don't remember exactly when I got back in contact with him and filled him in. But I gave him an interview, I think in the next week or so, a long talk over the phone and he wrote an article and they made a sketch.

In fact, the sketch that appeared in the paper is in the book, I believe. It's – here, it's on page 29. This sketch of an underwater scene was made by Frank Pinnock, an artist who worked for the *Tribune* at the time. And he made that sketch from my verbal description over the telephone. And when I saw the sketch I gasped and I said, "That's exactly what it was. It was exactly that." His sketch was so appropriate, captured it so well.

*00:55:00*

I had two other people I wanted to contact right away, and one was disappointing. It was John Hall whom I had done the first strategy with, and I didn't reach him, and never did again. Never – and I have no idea if John ever knew that we had succeeded in diving on Cordell Bank.

And the other person that was very keen on telling was Don Dvorak. And the reason is Don had started with us on the project and he had been to every meeting and every strategy session and talking a lot.

He and I became close friends. And it was so frustrating out of eighteen times trying to load up the boat to go to Cordell Bank finally he had an opportunity in late October, the third week of October to go to the Grand Canyon, and he went. And it was that weekend we succeeded with our dive. And I had to call Don sort of like the General calling the Sargeant's wife to tell Don, "Don, I have good news and bad news. The good news is we dived on Cordell Bank, and you know what the bad news is."

And he said, "Well, I'm sorry to have missed it." The irony is that he stuck with the project, worked again for a year, then next year, 1979, we made only one single dive and Don was on board, but he was not the diver. And after that first dive I had to abort the rest of it, the conditions were wrong. So it wasn't until the third year that Don succeeded in diving on Cordell Bank.

*Livingston:* Now, you've had your first dive and you've described that quite well. So what did that first dive inspire in you in the following days or weeks? Did your goals or plans change after that from what you'd learned?

*Schmieder:* Well, as you can easily imagine, we were almost to the point of giddy with our pleasure at ourselves. You know, we were so happy and so proud. So we decided to have a public meeting. And we had connections at the Cal Academy and they made available one of their meeting rooms.

So we decided, I think it was in November, to have a public meeting and display what we had done. And so word of mouth got around and we had slides, not underwater pictures, but other pictures, and we put together a bit of a program which included introducing various people who had been important in participating in this.

Ironically as we were assembling in that meeting room for this public meeting the San Francisco Microscopical Society was meeting in the small room adjacent. And when they – somebody came in and said, "What are you doing here?" And we said, "We just came back from an expedition to Cordell Bank and we have –"

They said, "Well, may we join you?" So they adjourned their meeting to join our meeting and our ranks swelled. So we had maybe 50 people at this meeting.

And so we described what we had done and it was trivially easy for me to project into the future. So I said, "We want to go back to Cordell Bank and we know where to go, we know how to do it now." I showed a lot of confidence, some of which was not yet earned. "And we're looking for anybody who wants to perhaps participate in any way you like."

So the San Francisco Microscopical Society offered to look at any diatoms we might collect, and I handed them a jar of diatoms, or stuff, gunk, grunge, we called it. But the really important thing that happened was that there were several people there who had been friends before and had participated in diving projects before, in particular an underwater cave diving project.

Now, cave diving is serious stuff. I wouldn't do that. That's for really good people. But here were three people, Bill Kruse, Tom

Santilena and Paul Hara, and they had carried out this project up in the Sierra and had dived on an underground river and lake and had collected cave adapted specimens, several of which had been subsequently identified as new species and described in the literature and named for one or more of these people.

*01:00:19*

They came to me after the meeting and said, "We'd like to join you. We'd like to participate in this if you would like us to." And they explained who they were and what they had done. And I recognized instantly these are the kind of people I had dreamed about finding, project people, extremely competent divers.

I said, "As of this moment you're part of this project." So Bill, Tom and Paul became lifelong very close friends, and at the same time, actually at that same meeting, was another man, Harry Sherman, who was not part of that cave diving group, but Harry Sherman, Bill Kruse, Tom Santilena, Paul Hara showed up or appeared at, I met them, at that public meeting after our first dive, first expedition, and they together with Don Dvorak and myself became the core team that essentially carried out and led and then trained so many others to go out there and do the rest of the project over the next six or seven years.

*Livingston:* Bob, could you talk about the next dive in 1979? Tell us that story.

*Schmieder:* After our success in 1978, and we were so optimistic and we had this public meeting, suddenly the team swelled in size. I suddenly had what I considered for the first time a competent team both in terms of scientific orientation and diving capability, technical diving capability, as well as team members who were really into the project as a project, not just going along for some other reason.

With that optimism we planned to go back and in 1979 to carry out a much more extensive series of dives, get the first photographs, for instance. We had seen it, now we needed to really document it, and that's what we had in our minds, our plans.

And we planned accordingly, and by that time we'd learned a little bit about the weather and the sea states. So it didn't take us eighteen times to get back out there.

So when we did we got out there and the conditions were acceptable. They weren't as good as the previous year, they were acceptable. What went wrong was we couldn't find a shallow point. And the reason was we decided to go not to the same location that we had dived in 1977, but to start exploring other areas of the bank.

We thought, "Well, this is fairly easy." And in the meantime we had done some surveying, which means we had just driven the boat back and forth recording our positions as we went, and recording the depths on those positions.

So we were doing surveying at a very low rate, but we started discovering other points that were 20 fathoms or less, and we were amazed. They were not on the chart. There was no hint. No one had ever indicated to us that there would be other diveable points.

So by the time it came to expedition time, October in '79, I decided, to go dive on one of these other points that we had discovered, the shallow points.

There's a ridge up near the north which I tentatively called Tor Hakluyt. Tor means "mountain." Hakluyt was a cartographer in the 16th Century, did a lot of the maps that we now know as classics.

So we went for that as a target. Everything seemed to be going just fine. We went out there and we eventually found a shallow place. It was not 20 fathoms; it was something like 22 or 23 fathoms, fathom being six feet.

So, you're talking about 140-50 feet, that was still acceptable. We dropped the anchor. We had not yet evolved reliably the technique of going up current and hooking on the back side. So we dropped the anchor thinking we were hooking on the place.

The anchor seemed to be stable. So I decided we'll get the team in the water. The first team was Bill Kruse, Tom Santilena and Tom's brother John Santilena.

*01:05:25*

My strongest divers, and year after year I used them for the first dive because they had to be adaptable and resourceful. If anything went wrong I wanted them, more than myself, to be there, because they were better than I was – stronger at handling the diving, the mechanical aspects of diving.

Everything seemed fine. So we put them in the water and watching the watches and eventually the time went by and we were saying, "Well, they're about half way through." And suddenly Bill Kruse came zooming out of the water like a Polaris rocket. I mean, it seemed like he leaped completely out of the water, which he couldn't have done, but it seemed like that.

And simultaneously let out a yell that sounded like he had just lost the lower part of his body. And I muttered, "Shark." And I thought that we would see nothing of Bill but a few shreds. I thought that was – this was a disaster in real time.

And pretty soon John Santilena came to the surface away from the line, but clearly under control, and eventually Tom came to the surface, I believe it was on the line. And Tom came up, but Tom's a very calm, collected guy, and he came to the surface, he says, "Well, how's it going?" or something, you know, like that.

And I said, "We've got a major emergency going on here." He said, "Oh, really? What's the problem?" I said, "Well, Bill's out there and he's probably dead." And Tom said, "Oh, no, no, Bill's all right."

So we went around and we collected these people, got them out of the water and said, "What happened?" And what had happened was they went down the line, John had a goodie bag for collecting specimens, Tom had camera and Bill Kruse was the safety diver, I think.

They went down the line and down the line, the visibility was wonderful, there was no current to speak of, and they got to the bottom of the line and the anchor was floating about 15 feet above the bottom and drifting away.

What apparently had happened was we had dropped the anchor on the down current side of a cliff, as the sea and the current lifted the buoy, which was actually an inflatable boat now; it had pulled the anchor up off of the bottom enough so that it was completely off the bottom.

And as it drifted further the bottom got deeper and deeper, so it never got on the bottom again. Because you have to remember, these are tiny, narrow ridges. So by the time they were going down the line, and there's no visual reference out there. We had no idea they were completely way off of the shallow place.

So they went down to the bottom, or near the bottom, they could see the bottom right below them. John and – well, actually all of them went right to the bottom. They let go of the line and went to the bottom at 205 feet, collected some specimens, not many because there were not many there at that depth, as you know from the photographs.

Tom took some photographs, the first photographs taken on Cordell Bank, at 205 feet. And as they surfaced Bill Kruse's dry suit valve stuck and it inflated him like a dough boy and he came out of the water at an uncontrolled emergency ascent.

And he did the sensible thing, he yelled. It sounded like he was being killed, but he yelled to get our attention. So they had done superbly, this team, incredible. And I just couldn't believe that they had done this. And I didn't even know that they had gotten specimens. I knew that he said he'd taken some pictures.

And we were all just sort of regrouping and getting our bearings and calming down and John said, "Well, did you look at the specimens?" And I jumped up and I said, "Specimens? You got specimens?" And sure enough he had a small collection of specimens which in the overall scheme they were pretty inconsequential, but these were specimens.

*01:10:08*

So we had not only done it the previous year, we did it again to show how good we were, and we had photographs now. So we

could now claim – we didn't want to show the photographs because they're pretty meager, but we could now claim we are capable of collecting specimens and taking photographs at the bottom at Cordell Bank.

That was good enough for us to throw another public meeting at the Cal Academy, which we did, in the same room. And we had about the same number of people. But unfortunately, we didn't have, you know, a huge inventory of, you know, a rich collection of things. And so we made the most – got the most mileage out of the tiny collections that we made.

But the success that they had in doing that under those conditions allowed me to decide, "Okay, we can still do this. We're not going to close the expeditions and stop. We will try it again next year." And from the next year on we did very well.

*Livingston:* From what you had learned in the first and here second dive, did you alter your preparations? You must have learned some things to help you prepare.

*Schmieder:* Well, I think we learned that it's critical to know how to set the descent line and how to test it. So when we would put the line down, first of all we evolved this technique of hooking the backside. Then we would get the inflatable tied on it. We would test it. We would pull on it. We wouldn't just assume that it was in place. It may hit the right place but it might not stay there.

And these are hooking type anchors, not deadweight anchors. So we did that and that enabled us to get a more reliable descent line.

The gear and the procedures, the rules that we had evolved at the beginning of the project didn't change, they were always the same. Single dive for a team, for each person, twin tanks, octopus regulators and so on. The goal also did not change. The goal always had been, "Let's go and explore. Let's find out what's at Cordell Bank."

I knew at the outset that we could not do systematic science. We had to do grab-sample opportunistic science, and that's all we were

ever able to do. In fact, to this day unless you bring in much greater resources that's all you can ever do at a place as difficult to access as Cordell Bank. So the goal didn't change either, just the time frame.

*Livingston:* What happened to your first divers in 1978? There are four divers that we haven't heard of yet.

*Schmieder:* Well, I should have been more cognizant of the naturalness of people's evolving interest. After all, we had started with 40 people at the Geological Survey and by the time we actually dived a year, plus later, there was only one person, me.

I found that very frustrating, even found myself feeling angry at abandonment, if you like. We would come up to Bodega Bay and the divers would say, well, they would look at the ocean and they would say, "That doesn't look like fun."

My reaction, which I was not always able to stifle was, "Well, we're not here for fun, *are we*? We are here for science." So I should have been better prepared.

After we had the first dive in 1978, and that was so successful, to my surprise and I guess disappointment, some of the people just sort of got – just sort of drifted away and got interested in other things.

I can't really say what their motivation was in the original dive, maybe it was just simple curiosity and then it was satisfied. Of course, by that time, and long since before, I was deep into a lifetime obsession. I was prisoner to my own obsession about this. So there was no question of me drifting away.

And when other people would drift away I would be disappointed and frustrated and a little bit irked that their commitment was not mine.

*01:14:58*

This was especially astonishing to me when one woman, a potential diver, said, "Well, no, I don't think I can be away from my fish for more than two days. So I won't be able to do this."

And I said, "What? Your fish are more important than science?" I don't think I said it to her, those words.

So Steve Lawler, who had been a very important principal in this project, had really taught me a lot about diving. He knew about projects. He knew things like the Latin binomials for species or genus species, you capitalize the genus and you lowercase the species. This is the way you write it.

By that time I understood that, but he knew it. And so he insisted as we would sort specimens, he insisted on getting those things right because otherwise we would look like silly amateurs. Maybe we were but we certainly didn't want anybody else to think we were silly amateurs.

Dannie Baxter was always a little distant. I never got to know her very well, and she had a husband and they had other interests. So I think they just sort of had other interests.

Don Griffin faced some medical problems and I don't know any details about that. But I respected that a lot. He just felt that he couldn't – he stayed involved for a while.

And Larry Pfoutz, I guess was similar. He just sort of had other things he needed to do in his life. And it was sort of that transition – '78 through 1980 – that I saw that people would come in and they had a latency period. They would come in typically for a couple of years, then they would drift away.

The core group which was myself, plus Don Dvorak, Tom Santilena, for a long time his brother, John Santilena, Harry Sherman, Paul Hara for some time, Bill Kruse, Sue Estey. Those are the people who stuck with it from their beginning until the present time and are still deeply involved as witness whenever you have a [Cordell Bank National Marine] Sanctuary event. We all show up. And we're not here just for the baloney.

No, whatever that metaphor was. I should say doughnuts. We're not here for the doughnuts. We bring the baloney and we come for the doughnuts. Okay.

*Livingston:* So now 1980, you went for a third season. And so could you describe the events of that season?

*Schmieder:* The third season started just like the others with a fair amount of planning but now less planning, because we didn't have to talk so much about plans. We basically had proven that our preparations were sort of right.

What consumed a lot of time in that year between the 1979 dive and the 1980 dives was meeting new people, getting new people in because I needed a lot of people at that point, and they showed up in droves because the word – the reputation was around there's this project. And there were a lot of people who really want to do things like this.

So we had lots of people but I insisted on doing a practice dive, full gear, 150 feet, decompression, with every new person. He couldn't go to Cordell Bank with me if I didn't do a practice dive with you.

So that consumed a lot of time. I was down in Monterey diving with new people a lot. And then by the time we were getting ready to go back to Cordell Bank in the fall I spotted a boat in the marina at Berkeley and kind of wondered who owned this boat because it seemed to be about the right size and it was kind of a romantic looking boat. It actually had been a shrimp fishing boat.

As I subsequently found out, it was owned by a man named Breck Greene, and he had brought it from Louisiana through the Panama Canal which he moved to California after his first wife passed away.

So I left a note on his window saying, "Would you like to make this vessel available for a National Geographic Oceanic Expedition?" Carefully worded, not a lie, I had a small grant from National Geographic by that time.

*01:20:07*

And I subsequently found that he and his sons had strategized for days, "How can we get these guys? How can we nail this

expedition – this Geographic expedition." When we finally got to know each other he saw it was really just a group of enthusiastic amateurs doing this. But he decided to do it with us anyway.

So for a fairly nominal charge, essentially the fuel, he agreed to take us out there in this boat. It's 67 feet at the water line. Shrimp boats have a round bottom. You can imagine how this thing rolls. So everyone except me, every time we would go out on this boat, everyone except me was deathly sick.

Why was I not sick? Because I always had something to do. I had to manage people and take data and stuff like that. Besides I'm not generally sick.

So we got into agreement with Breck, introduced him to the group, we got familiar with the boat, and then we started loading it up with as many as 20 divers plus miscellaneous support people and gear to process specimens and so on, and we would go out to Cordell Bank.

Sometimes we would succeed and sometimes not. One time we went out, we would typically leave Berkeley at 2:00 in the morning or 1:00 in the morning, and try and sail all the way up to Cordell Bank and then back to Drakes Bay.

Well, we got out a little past Mile Rock, actually a mile or two past the Bonita Light, and the engine coughed and died. And Breck went down below and pretty soon we realized he had forgotten to put fuel in the tanks. We ran out of gas, believe it or not.

And there we sat for hours until the Coast Guard came around. In those days they didn't send Vessel Assist which you have to do now, commercial organization that you pay, the Coast Guard would rescue you. So we waited for some hours, almost until dark until the Coast Guard vessel came out and towed us all the way back to San Francisco.

Another time we went up to Drakes Bay and the weather out to Cordell Bank was pretty bad. In addition Breck had the regrettable, and apparently unalterable, habit of sailing around the

point right at the head at Point Reyes, right close to shore. Well, even an amateur knows that's where the big swells and surf break. And then he would come into six foot waves and turn around and say, "This is way too rough."

"Breck," I would say, "move out three miles off of the head. It's calm out there." But we were not always successful in doing that. But sometimes we were successful. This was an opportunistic project, after all. So sometimes we would go up to Drakes Bay, spend the night, 4:00 in the morning we would sail around the corner out to Cordell Bank.

And at times during that year, 1980, we would have conditions like the first year, so calm the gulls on the surface would make these ripples that would expand 10, 15 feet out.

You know, we would be in ecstasy with that. And with eighteen divers, say, we would make six teams of three divers. The rule was only one team in the water at a time. We'd get the previous team out and debrief them, and let them make the call, "Is it safe to make another dive."

And on several of the days during that year we got all the diver teams in one after another and safely back to Drakes Bay with our goodie bags chock full of specimens, huge, probably 150 pounds of specimens.

Don Dvorak would take his cameras, he mounted three underwater cameras on a bracket and he would go down to the bottom and come back with more than 100 photographs of the bottom on a single dive.

So that was the year that we essentially used the validation of the techniques that we had evolved to carry out a much more extensive exploration and documentation of Cordell Bank.

And by the end of that year we had a huge number of specimens, huge number of photographs, charts of new pinnacles that we had discovered. We discovered five of the six or four of the five shallow points.

*01:25:05*

And so that formed the incipient body of knowledge about what Cordell – and I was able to pull together a preliminary summary of what we knew about Cordell Bank, including some species – a beginning species list and the charts and the observations of the divers and some of the history, which by that time I had elaborated all the history with Edward Cordell.

So by the end of 1980 we were starting to get a pretty good idea what was at Cordell Bank, and felt pretty confident that we could carry on as long as we wanted to. And that was about the time that I became aware of NOAA and the Sanctuary Programs Division and that road less traveled made all the difference.

*Livingston:* So in these first three dives you were still unregulated really, you were still on your own.

*Schmieder:* That's correct.

*Livingston:* And did you say how many dives you made in 1980?

*Schmieder:* I didn't say and I don't actually remember, but I think there were probably three successful trips that year. And when they were successful they generally were very successful. We went with, you know, all the divers and a lot of specimens.

We had one trip, I think it was actually a later trip, John McCosker from the Steinhart [Aquarium] was with us, and the first team down had trouble, and I had to abort the diving for the rest of the day. John was already suited up, ready to go in. So it was a very great disappointment on that case.

And we had days like that, but we had enough successful days, I was satisfied with statistics. You know, if we have partial success, that's success.

*Livingston:* And you dived during 1980 as a member of these teams.

*Schmieder:* Yes, I was always a diver, '79 I was not – I didn't do that one dive that Bill, Tom and John did.

*Livingston:* Could you describe your experiences of those 1980 dives?

*Schmieder:* My dives were generally less exciting, less stimulating than the very first one was. Because as I described, the very first dive was accompanied by this overwhelming rush of having crossed a threshold.

Here we knew that we could do this, and so it was a question not of existence, but of performance. So my task was to collect as many specimens as possible, fill that goodie bag. And sometimes I would take two goodie bags, fill them with as many as possible and as diverse collection as possible.

And I would exhort the team to, "Do not collect multiples of the same thing. We have lots of the *Allopora californica*," the California hydrocoral, "get different things. Wherever you look if you see something that you don't recognize, that's a good candidate. We're not trying to make a plot, we're not trying to survey this, we're trying to collect things."

And we used the words "rape and pillage" and things like that. Of course, we couldn't do any significant damage, just negligible stuff that's healed rather quickly. And so I kind of prided myself, I was satisfied with myself that I would collect large amounts of things.

It seemed like the other divers never quite caught on to how much mass I wanted collected. They would come back having picked a few things and would say, "Well, I didn't want to damage the place." Or, "I wasn't sure about this. I thought about this and I picked a few things very carefully." I said, "Where's the rape and pillage part of this?"

So I was routinely kind of semi-disappointed in the aggression that the other divers would not have when they were collecting. And I ripped and tore and collected huge amounts of things.

Of course, we can wince when we think about that, but it was local in time and space. It didn't harm anything. And after all, as I tell my students on the boat now, "If a few things don't die and enable

us to learn about this place, many things will die in ways that we don't want to even think about. So this is a good use for these materials." And the students always agree.

*01:30:17*

*Livingston:* Did you continue the rule about no artifacts during those dives?

*Schmieder:* Yes, that was the rule. But by that time I had a team that was oriented about science collecting and we knew that we were after invertebrates and photographs. So no one was tempted. I actually didn't have to beat anybody up about no artifacts.

We saw them. We would see a lot of filament. Now and then we would see an anchor, we would see a fair amount of lead. Quite often we would only see those things inadvertently. It was covered with anemones and sponges and things. But clearly there had been a lot of debris.

So I started describing this when I would give a talk. I would answer the question, "Do you see any fishing gear or any gear?" And I would say, "Yes, but the Bank is such a vigorous environment that if you leave something there it will get covered in a relatively short time. And as long as it's not toxic or decrepitatious or whatever, it'll be okay. It's just become part of the bottom."

Breaking things is a different matter because very quickly – and it was during that year, 1980, that I first started noticing how much broken hydrocoral we were seeing. And it was an amazing sight to see all this stuff. And at first I assumed it was fish that were bumping into it and knocking it over. But then I said, "Well, fish wouldn't do this. They're smarter than that."

And eventually I realized it was the fishermen with the fishing technique of feeling for the bottom with a lead ball that was doing the breaking. And I started talking about that and that I talked about all the way through the Sanctuary hearings and the development process, and in my comments here and there that this was a significant effect on Cordell Bank.

*Livingston:* So these 1980 dives is when you first started observing that.

*Schmieder:* That's right.

*Livingston:* I became aware of it, at least. The first dive, of course, I didn't see the bottom and there was not much to see in the second dive in '79. The first dive was exquisitely beautiful as I described and I didn't notice if there was breakage like that. I just simply didn't notice it. But in 1980 I started noticing how much damage there really was.

*Schmieder:* Now, you had mentioned a small National Geographic grant. These dives of '79 and '80 got quite extensive. How were those funded?

*Livingston:* By and large with the exception of the NOAA Sanctuary Divisions money during – for two years, I think it was '82 and '83, and small amounts of other things which I will mention; this was just a joint self-funded project.

I would make a budget; a rough estimate of what it was gonna cost us. It was Breck for his boat. I didn't try to buy group equipment or expedition equipment. In my subsequent expeditions many years later I budgeted and we would go out and buy tents if we needed them.

But here I kept the budgets low enough – of course, everybody had to take care of their own dive gear, their own food – not the food, the transportation, and so on. And if someone would lose a camera, I'm sorry, we're not gonna fix it for you. It's just the risk you take.

Then I would say, "Okay, here's what we need from you for this weekend is $40," or $80 or some numbers. And we would buy the food and there was generally a wife or another person or some of the expedition members who would do the cooking.

So we would make chili or we would make tacos, steaks usually Saturday night on a barbecue. And the budget was just a shared expense. A couple of exceptions, the Geographic grant was all of I think $1,500 and it was very valuable in the sense that I could put

the note on Breck's boat, say, "Would you like to make this vessel available for a National Geographic expedition?" And it got him.

*01:35:12*

I also had a small grant from the Explorers Club. I think it was $1,200. Because they have a fund for sort of Junior Explorers. Well, I was not a junior by any means, but I certainly was not a person of Heyerdahl and Hillary's reputation or stature.

So they gave me a little grant, and of course, I was not a member of the club at the time and didn't even think that I would ever become a member because the Explorers Club has serious explorers in it, at least most of them are.

It wasn't until much later that I actually was invited to become a member. But we were very proud of those grants, small as they were. Then when I got to interacting with the Sanctuary Programs Division they asked if I could use some money. And I had a ready answer. And so we figured out how much – and I think it was about $15,000 or $17,000 each year, which for us was big money.

By that time Breck was wanting more money for the boat. So most of that money went to the boat. And I think I started using some of that money to buy alcohol, formalin, jars, things that I formerly had just squeezed out of somewhere.

And I think I just used those small amounts of money to get things that I would have paid for myself personally before. But it was a bigger project by then. We needed more things.

*Livingston:* And that time that you're talking about where you started to get these bigger grants, this is after 1980. Is that correct?

*Schmieder:* Yeah, I think that was '82 and '83 that NOAA actually provided the funding. I'd started talking with them in '81 or somewhere close to that.

*Livingston:* So this is the end of the interview on June 25, 2009 with Bob Schmieder, and it will be continued at a future date quite soon.

*[01:37:36, end of audio file 2. Begin audio file "CBNMS Schmieder 3" at 00:00:00]*

*Livingston:* This is July 9th, 2009, and we're continuing an interview with Bob Schmieder of Cordell Expeditions, and speaking about early diving and subsequent dives on Cordell Bank. The interviewer is Dewey Livingston, and with us here is also Jennifer Stock from Cordell Bank National Marine Sanctuary. So this, in essence, is part two.

In context with diving Cordell Banks, and your experiences there, how did it differ or was similar to other areas that you've dived?

*Schmieder:* Cordell Bank was of course deeper than most places that I had been diving, and that members of the group that I was diving with had normally been diving. Sport divers are normally restricted to less than 100 feet of depth, and in depths like that, and close to shore, there's a community of organisms that we're quite familiar with. And so, getting to a place that's far off-shore, 20 miles, and going down from 100 feet to 150, 60, 70, 180 feet, the community, visually and numerically and functionally, of course, are very, very different. But, there were other places that we could compare them with, because there are other off-shore banks, some of which are far enough offshore to be relatively isolated.

So, there's a bank on the back-side of Catalina Island that is visually very spectacular, as we found Cordell Bank to be. In that sense, it was similar to what we had seen on that bank; colorful, abundant, and so on. But, it's tougher to compare it – of course, anything can be compared, but the comparison to, say, shore-line communities makes less sense than the comparison between off-shore banks.

*Livingston:* Could you name the bank off of San Catalina?

*Schmieder:* Tanner Bank. And then there's the Cortez Bank, which is shallower. It's off of Los Angeles. Tanner Bank is the other one that I was thinking of. There's a bank, of course, off Point Sur, and we were the first to explore and describe that. And I can tell you about that at some appropriate time, whenever you wish.

*Livingston:* Comparing your experiences at Cordell Bank with diving off of Point Sur would be of interest.

*Schmieder:* Well, the first thing you realize is that, even though the Point Sur Bank is a little closer to shore, it's about three miles off instead of twenty miles off, it's still far enough away to be mechanically pretty isolated. So, the community that lives there, as on Cordell Bank, is pretty much isolated. That's why we refer to it as an underwater island. It's insular. The two banks, Cordell Bank and this other bank are about the same size, and about the same depth. The shallowest depths are about the same, 120 feet or so, and they are both – the topography is a very small number of very isolated shallow ridges or pinnacles.

It's not as if, in either place, there's a large flat area that's at 120 feet. These are extremely tiny, spiky protuberances that stick up, and that's where the most dense communities live. This is in common with both places. Also, both places are along the coast, and so they're subject to the California current, which is a southward flowing current. And they both experience the Davidson current during the right time of year, which is the fall, and which comes up and flows the other direction. So, the environment in which these two places – and there are many other places that are similar – are immersed are very similar, so it makes sense to compare them. And we did compare them, because we did explore the other bank, and we did numerically compare what we saw in the communities on those two places.

*00:05:10*

*Livingston:* Speaking of diving at Cordell Bank now, and again throughout the period that you have dived there, could you address the surface wildlife that you saw in the area, if there were any memorable wildlife encounters, et cetera?

*Schmieder:* Well, the most memorable one I described earlier in our discussion here, and that was our locating the bank, a diveable place on the very first dive that we made on October 22nd, 1978. We were searching for the shallow place, which we thought we knew we could find. We thought we could find this place, but for hours we searched and searched, and found absolutely nothing diveable. And then, I said, "Well, over there are the birds," and it was Edward Cordell who located the bank back in 1869, by looking at where the birds were.

So, we went over to where the birds were, and sure enough there was the shallow point. Now, that could be partially coincidence, but it's not entirely coincidence. The birds are there feeding on what is accessible to them. Some of them are diving birds, Cormorants, for instance. And their food is coming from the benthic community. So, where it's shallow, the community is most dense. The fish are there feeding on the invertebrates. The birds are there feeding on the fish. And so, in addition, the whales and marine mammals, which have a larger range and will move around much more broadly, are still going to be attracted to where they will encounter whatever it is they consider food.

So, it's the fact that the topography has these shallow pinnacles that are densely covered with organisms, the community. That's what acts like a magnet for the birds and mammals to be located there.

*Livingston:* And were you able to observe that in the case of whales, or in sharks, et cetera?

*Schmieder:* The whales tend to range much more broadly, and we certainly saw whales. We didn't actually try and track them or keep track of them. The reason, of course, was that we were busy trying to carry out dive operations. So, we would make note, and I tried, and usually did, have somebody on board who was a bird/mammal person who would keep his or her notebook. So, those records were made, and some of those were incorporated. Steve Cooper and Mark Webber put together a report on the birds and mammals early on. We certainly saw blue sharks quite abundantly. On some days, we would feel we were in the midst of a huge – let's see, what would it be? A herd of – not a herd of sharks, a – a – a something of sharks. And we dived among them. They were not a threat to us at all.

Blue sharks are just fish to us. We would see a few marine mammals. We sighted a northern fur seal. We were able to sight the tag and capture the number on that tag. And that animal was tracked back to its origin in the Pribilof Islands. And of course, they were right there where we were, and we were there because of

the shallow places. Beyond that, we were unable to make any more systematic observations. Were they, you know, hanging out above the pinnacles? Or were they ranging more broadly? I just don't know.

*Livingston:* Do you have any idea if just your presence there was attracting - ?

*Schmieder:* I suspect so. We found things like the seals to be somewhat curious, somewhat disdainful. Now and then we would have dolphins that would ride the bow wave with us, but then they would, I guess, get bored and go somewhere else. Once or twice, we encountered a whale or two that seemed to be very attracted to the boat. Now, I don't really know – we thought that they were attracted to us. We were whistling at them and saying, "Gee whiz, look at that", and stuff like that. But, I think maybe it was Jenny [Stock] who suggested that they were actually looking for food in the shadow under the boat, which was a good thought, I wish we had understood that at the time. But, we found them mildly attracted to us, maybe. Nothing obvious. Nothing really to write home about.

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*Livingston:* To go back to the Big Sur Bank/Cordell Bank comparison, can you list species you saw that were similar, and species that differed? You know, for instance, in one place but not the other?

*Schmieder:* Yes. Pretty much, our goal, our task in carrying out the dives, the field operations, was to accumulate a species list, and for me, that was pretty much the invertebrates and the algae. And so, each time we would go out, that would be our goal, is to collect things that we had not collected before, so that we could extend the species list. Regardless of counts, we didn't attempt to quantify how much of this species versus that species. Furthermore, we neglected – as I've just described, we neglected the birds and mammals because that species list is well known. We documented it, and there was one very interesting example of an albatross, and I'll tell you about that.

So, as time went on, we accumulated this species list. The Cordell Bank list got to be over 400, 450 or so. The list from the Point Sur bank – we didn't spend as much time there, but it was a similar

kind of collection – and I think the species list got to 186 by the time we were finished. Now, these were species of all of the invertebrates and algae we could see, of which maybe a quarter of those species were algal species. The rest were invertebrates ranging from sponges to tunicates. Probably the largest group was the mollusks, the largest individual taxonomic group was the mollusks, 'cause they were easy to get lots of. Because, we would collect buckets of the sediment, not necessarily live specimens, but specimens appearing in this bucket of gravel that we would collect as representing the population over the recent past.

So, regardless of what the population was of mollusks at that moment, we would have a collection representing, say, the accumulation over hundreds or thousands of years. And because of that, the species list, the number of those species was very high. Jim McLean at L.A. County Museum processed a good part of that material, and was very careful to identify those. So, there are probably 50 or 60 mollusks in that group. There was a surprisingly small – surprising to me – small overlap overall, for all species, between Cordell Bank and Point Sur. There was about a 50 percent overlap, that is the species in common. The biggest and most obvious is *Allopora californica*, the California hydrocoral. And some of the algae, *Desmarestia*, and others were very common. The *Corynactis*, the little anemone *Anthopleura*, many of these are very common species, and we found them very, very common on both places.

But, when you look at the numbers, how many species – with different named species there was an overlap of only about 50 percent, which I thought was surprisingly small, because of the similarities that I described between these two places. Because of that, I came to the understanding, or I sort of created a model in my mind which is based on the MacArthur/Wilson model of island bio-geography; and I'll give you just the essential basic of that. What that model says is that the farther away the island is from a source, a continent, a reservoir of species – and the smaller it is – the farther away and the smaller it is, the fewer species can be sustained on that island.

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So, the count of the number of species is a measure of those two parameters. It depends on those most strongly. Almost no other parameters, wind, sunlight, don't matter. It's how far it is, and how small it is. So, here we have two banks that are not so dissimilar, very, very similar, and yet they have significantly different populations. How do we account for that? The answer is that the island itself, what we should functionally call this underwater island, is not the size of Cordell Bank, five-by-eight miles or so – both of them are about five square kilometers above the 30-fathom line. We should not call that the island. We should call the island something above, say, the 130 – maybe 150-foot depth contour, maybe even shallower, 140-feet, that area is extremely tiny, on both Cordell Bank and the Point Sur Bank.

So, the islands themselves are nowhere near the size, functionally, as an underwater island, nowhere near the size that you would draw a circle on a chart and say, "Okay, it's this big oval, here." Because of that, the MacArthur/Wilson model is consistent. It says, "The smaller the islands are, the fewer species can be there." So, what happens is that if you have a very tiny island, and it's supporting a small number of species, but there is a reservoir of a much larger number of species that could live there just as well if they happened to perch there, then that population will change with time. A good visual image is, you've seen a bird sitting on a post – say, a seagull sitting on a post. Along comes another seagull, flies in, and the first one goes away, and the second one sits there. He now occupies that post. That's what's happening at Cordell Bank and Point Sur, and many other places very similar to this.

These populations – I use the word "Scintillation" – they are scintillating. It's like starlight. You look at a star, and it's not a constant brightness. It's scintillating. That's what's happening to these populations. You have about the same number of species, maybe 300, or 400, depending how you define your counting method. But, the specifics, 20 years from now – 20 years ago, certainly 500 years ago, 500 years from now, the specific list of species will be completely – not completely – it will be significantly different. Because of that, the recognition of that in a place like Cordell Bank, and now having the ability, or at least potential ability, to monitor those populations over time, to take

samples visually or with divers or imaging or submersibles, that's a really critical and valuable function that the sanctuary can perform as a monitoring function to essentially make our observations over and over again at sensible intervals.

It would be nice once a year, but even once every ten years, like a census, would give great insight as to what's happening in the populations. And because this is a dynamic system, managing it properly, as is the charter of the sanctuary, and protecting it, part of the charter, will depend critically on understanding how those populations *scintillate* in time, and how they change in time. So, that emerged from comparing those two banks, those two underwater islands, if you like.

*Livingston:* Now, would I be correct, then, in looking at your criteria of islands out there that, then, Cordell Bank, rather than being one big island, is actually a number of smaller islands?

*Schmieder:* Yes, and there's actually a whole subject called "Meta-population theory", the theory of meta-populations. A meta-population is a population of populations. So, if you take, say, one island – take the southeast Farallon Island, and you say, "What lives there?" Well, if it were populated nearby with other islands, and of course there's the middle Farallones, which is – and the north Farallones which is just a rock and a small number of rocks. That becomes a meta-population, and part of the dynamics – and this is captured in mathematical models that are – that are part of what professionals in this field do, they'll set up differential equations for the rate of change of these populations – the populations will move. So, if, say, one anemone, or one mollusk is living on this particular pinnacle, and not on another, you might say he has existed on this pinnacle, but extinct on that one.

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Come back next year, you might find that reversed. So, it's a critical part of the dynamics – it was a very good insight in your question – to understand the detailed topography of Cordell Bank, or the bank off of Point Sur, and to build that into the model, what are the areas of these specific places? What are their distances between each other? What is their relationship to the reservoir, which is the mainland, say, the coast? And all of that has to be in

the model. There's some job security there for someone who's really interested in it.

*Livingston:* Getting back to your experiences on Cordell Bank, what changes did you observe, year-to-year?

*Schmieder:* It was difficult for us to do anything like systematic observation year-to-year. And I have one example that we did do, but essentially all of the time that we were going out there, we were in sort of opportunistic exploration mode. And furthermore, I drove the whole project to be as broad and opportunistic as possible. In spite of advice that we would get from people who had the luxury of –maybe they're studying rodent populations on the desert, and they will take certain transsects, or they will take random samples, or grid samples of certain plants. We did not have that luxury. So, I deliberately biased the sampling for diversity. I strove and drove our project for diversity.

There was one case that stands out. We were able, because we were forced – because we ran out of new places to go to, because essentially, in our surveying, we discovered the other four or five places that are diveable, besides the one that led us there, which we called "Craine's Point." We went back over and over to the same places, and in some cases like the shallow ridge on the northeast side, the northeast corner, we became familiar. I have a mental image of what that looks like. I could walk you around it and describe a shelf on the west side, and so on. And so, on one occasion, we decided to – believing that we might be able to see this again next year, we decided to clear – completely scrape clean to the best of our ability, one patch. It was about one meter square. And this was done by the diver with a garden trowel, our standard collecting thing. He just scraped and scraped and scraped, and it all just went away, whatever it was that was there. And I don't actually know what was there.

And we took photographs and documented this bare space. It wasn't totally clean and bare, but it was essentially scraped of any erect organisms. We were able to go back the next year, and rather easily find that place, and document it again. And so, there was a one-year interval – and this is a good example of the kind of thing

that could and should be done – we were able to document what would be the first colonizers of that space. What would arrive first? You know we're familiar with forest fires and what springs up. Well, Redwood trees come right up, because they actually need the fire, and so on.

In this case, it was *Corynactis*. We found that square patch almost uniformly and solidly covered with this bright red anemone that's about a centimeter across, the *Corynactis*. We know that *Corynactis* is quite an aggressive organism. It has competition with other small anemones, *Epizoanthus*, and so on. But this is what we found. And so, that was a data-point for us, an interesting observation. Probably more interesting, because it indicates this is the kind of thing that can be done, and so I am able to relate what we did in hopes that, perhaps with sanctuary support or the research community in general, at large, can carry out such things in the future. And I believe that that's exactly what can and will happen.

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*Livingston:* I would assume that you would need to do a number of those tests, depending on depth and the direction it's facing, or a flat spot, a vertical spot?

*Schmieder:* Well, in field science, there are all levels in terms of what you define as, shall we call it, quote, "Good science," or "good research." If you're going to a place that has never been seen before, just observations are really good science. After all, Richard Burton and John Hanning Speke and others, searched for the origin of the Nile in the late 19th century. Just locating a lake, or a river, or a set of lakes as the source of the Nile would be – I mean, that's just an observation, simple observation. No measurements taken of any kind, except maybe elevation and barometric pressure for elevation, or something like that.

We were very much in that mode. It depends, if a person is interested and has the resources, perhaps an indicator species – you might pick the California hydrocoral, *Allopora californica*, because so many other organisms depend on it; they are commensals, or obligate commensals. So, someone might take an interest in studying that, as we have studied populations off the

Channel Islands, I've been part of those studies, systematic studies. I think any scientist who does that is going to have to concentrate on a – one or more indicator species, and define his project. If he wants to see how the *Allopora* is going over time, we will learn that.

That's not what we did in our project, of course, with the exception of the case that I told you about, and minor other observations.

*Livingston:* Any other changes that you might have observed?

*Schmieder:* Yes, there is – there is a significant one, but I can't defend, scientifically, that is quantitatively, I can't defend what I'm about to say. Qualitatively, I felt that we saw fewer populations of fish around the places that we were diving. The very first dive, which I described last time in great detail, had so many fish that it not only obscured our vision, it completely covered our ability to see the bank, until I actually passed through the fish, and then suddenly there it was. As the years went on, I felt that we were seeing fewer. Now, that's about all the documentation I can give you. We didn't make any quantitative measurements of it. The photographs don't give any real valid information, although if somebody went through the photographs – we have so many photographs, many thousands of underwater photographs – if somebody went through there, they might be able to examine – or they might be able to pay attention to the fish in the environment around there, and maybe make some rough – roughly quantify that.

It was my impression, only, but it was a strong impression, and I remarked on it at the time, and I've remarked on it since.

*Livingston:* What was the span of years that you're talking about?

*Schmieder:* Well, we started in 1978. That was the first dive. And I think it was through 1985, then we made one more dive in the mid '90s, 1995, I think. And so, it was that period. The dive in '95 was a difficult dive. I didn't have all of the same team. We certainly didn't have the momentum and the edge up. So, mechanically, it was harder. And so, the documentation was poorer, and it it was well separated from 10 years earlier. So, it was kind of a weak

data point in all of that. But, over the time from '78 to '85, I thought the trend was to fewer and fewer fish.

*00:30:38*

*Livingston:* Did you note whether they were juveniles, or adults, or - ?

*Schmieder:* Yeah, in the early days, there seemed to be more juveniles. In the later years, it seemed to be mostly adults, and fewer of them. Now, maybe my impression of fewer fish was that there were fewer juveniles. And I can't tell you, for sure. There were fewer fish, perceptibly, and it seemed to be more adults than in the earlier years. But, I've seen the video that was taken with the submersible, by the sanctuary, over the three years, and there are many, many fish – sort of, that evoked the images that we had in the first few years of our diving. So, I wouldn't be at all surprised. I wouldn't in any sense claim that there's a trend toward fewer fish. I would claim only that that was my perception, and that it's probably a chaotic function as most detailed observations in nature are. They are chaotic. Only on broad, statistical grounds are they regular.

*Livingston:* Based on your experiences diving there, what kind of questions came up for you – for example, abundance or absence of species, and over time did those observations shift?

*Schmieder:* Well, there was one case, and this is a rather narrow answer to that question, which maybe I could speak about the broader issue. But, there was one case that was very interesting to me, in particular, because it serviced my interest in characterizing, describing Cordell Bank as an island. And that was this diatom called *Entopyla incurvata*. It's a very rare diatom. It's rather large. And it's considered a relictual species. It's a relict. The reason is, it's normally a shallow-water diatom, but we collected it at Cordell Bank in what you would call deep water. So, here it was, very abundant in our collections. And in fact, we were able to pass the specimens on to a person with a scanning electron microscope. And we got the first real detailed images, and they're in the book, a full page of those images of that diatom.

Well, the reasons that's such a significant diatom is because, if it truly is a relict, then it apparently is known from only a few places

– three, four, five places in the world. What we're seeing is, that diatom has survived on Cordell Bank, even though the water depth – the water is rising now. The bank stays more or less where it is. The water rises and gets deeper and deeper. So, this plant, the diatom, finds itself in deeper and deeper water. And in most places in the world, it just becomes extinct, because it needs higher light level, or whatever it needs. At Cordell Bank, it did not go extinct. So, is there a reason for that? Would there be some other member of the community there, maybe an alga that this diatom attaches to, it would be an epiphyte, a plant living on a plant. Would it be the abundance of some other algae that would enable *Entopyla* to survive this terrible depth-increasing event? And if so, what is it?

Let's say this is alga-X. Well, alga-X is going to depend on other features, or factors, or parts of the community. Maybe there is some other organism, maybe it's a starfish that preys on this particular alga, or does not, and that starfish is or is not present on Cordell Bank. And why would that starfish be there? Because maybe there's an absence of marine mammals, sea otters, or something, because the sea otters can't survive in that deeper water, but that enables the starfish to. And then, that cuts down on the algae, or some process like that, some chain like that. Well, that's a very rich concept to explore. And that's why *Entopyla incurvata*, that little diatom, in my mind, was and remains so significant.

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We were able to get a loan of the specimens that were collected by Edward Cordell in 1869, as he made the first discovery mapping of Cordell Bank. And one of those, we, with permission, opened and examined the materials under a microscope, to see if that diatom was present in the material that he collected. Disappointingly, we didn't see any, absolutely zero, not one single *Entopyla incurvata* diatom. In fact, we didn't see diatoms at all, which may be because he didn't collect any. He would not have known, of course, because these are microscopic. And more likely was because the diatoms that he collected, being glass, are absorbed into the glass vial that he put them in. So, sadly, our record is lost. It should've gone into polyethylene, or something like that, which he didn't have.

But, that was a – for a moment, a nice possible opportunity to see how – now, and maybe it's significant. Maybe there were no *Entopyla incurvata* diatoms 100 years ago, and there are now, which would raise an even more significant question. How in the world can a relictual species get there if it didn't hang on and hunker down, and be a relict? So, these are really interesting questions.

*Livingston:* I want to get back to looking at the Cordell collections, but I think there's a better spot for that. Anything else come up, though, on that same [previous] question, then? If there were other questions that came-up for you as you were diving that might be of interest for this interview? Even if it's more about the changes through the ten or so years?

*Schmieder:* Yeah, there were many organisms that we were familiar with in diving at other places, especially along the coast, that we did not see at Cordell Bank, and we remarked about it at the time. For instance, we never saw an octopus. But, in the video tapes from the submersible, there are the octopus, very, very prominently. It probably doesn't take any leap to explain that. We probably scared them away. We were there in the day time, they like to come out at night. And so, that's not too important. We didn't see any large kelp, and we came to understand from Paul Silva at Berkeley, who accessioned and described all of the algae that we collected, that the light, as a function of depth, is really the critical factor for plants; less so for animals.

But, for plants it's really critical, so the big kelps have to have 100 feet of depth, or less. And so, what we found very prominently at Cordell Bank was an alga that sticks up like a single leaf, sort of like an elongated oak leaf, and it's kind of brown. It's called *Desmarestia tabacoides*, because it's like tobacco. So, we found in a zone from maybe 140 to 160 feet that was pretty common. Below that, was an alga called *Maripelta rotata*. And this is sort of like a little mushroom, but not with a thick cap. It was like a single vertical stalk of a couple of centimeters high, and then a flat disk perpendicular on the end of that stalk. Well, that was a light adaptation. It's red so that it can absorb whatever blue light is available. And it's flat and faces upward, so that it has the

maximum projection exposure to the light. And we found that, and that was consistent with the general models of what should live where, and not only where in a longitudinal sense, like up and down the coast and out in the ocean, but where up and down in the depth. The depth variation of these various organisms was a critical part of what we were aware of and trying to document.

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And in fact, in the collections that we made, there are hundreds of new depth records. We collected these specimens, or observed them and documented them, deeper than they were ever known to live before. And that demands – that begs an explanation. And we have a partial explanation for that. So observing these various species and groups of species, and documenting where they were, was all part of this process of trying to understand what lives there, and why does it live there, which is captured under the title "Ecology of an Underwater Island."

*Livingston:* And so, based on what you saw in the shallow spots, did you have assumptions on what the rest of the bank looked like? Did you spend time thinking about that?

*Schmieder:* Not really. As divers, we had a limitation. We certainly didn't want to dive to 200 feet. We did on inadvertent occasions, and I described that last time with the 1979 dive. But, we had to stay shallower than about 140, 50 – 160 feet, say. And that's really all we were really concerned with. We could document – because, we could look down and sometimes photograph deeper, but as the community tapered off there, the density of organisms, and it became, you know, solitary corals and brittle-stars, and things that are okay living in deeper water, but pretty thin, basically our interest tapered off, because we had no opportunity to document anything there.

We tried very hard to document the very shallowest points. So, on the northeast ridge, the shallowest point was 114 feet or so, plus or minus tide. And we photographed the blazes out of that place, in trying to see what was – and in fact, discovered in the process, that the top four, five, six feet of it is covered with barnacles, not *Corynactis*, not the anemones. You just go down five feet below the top of that ridge, and it becomes very quickly a different

community, and the community that's familiar in so many of the photographs. But, the very tip-top of that ridge is solid barnacles that seem to compete successfully for all the space against almost everything else. And that's a significant observation.

*Livingston:* When you dived there, did you feel like you were near shore in terms of diversity of species?

*Schmieder:* Oh, absolutely not. We always had the feeling that we were very far away. Certainly when I dived, I – in my head – you know, you can carry on several thoughts simultaneously in your head. You're aware of this, and because you have various senses, I was always very aware that I was way out in the ocean, and that just over to the side over there is darkness and death. And that, of course, is captured in the idea that Cordell Bank is an underwater island. If you move away from it, you die. That's why we had rules for stretching out transect lines. Divers were never ever to go away from visual sighting on a line, and preferably stay within arm's reach of a line that returns you to the surface.

So, we knew, and we felt that this was very far away, and it was quite different, visually, and of course in the numerics, very different from the shoreline that we were familiar previously from dives.

*Livingston:* Did you observe evidence of human activity? And we'll get into the holes, so –

*Schmieder:* *(Laughter)* Yeah.

*Livingston:* Maybe first, if you saw evidence of marine debris, fishing gear, disturbances, and then let's get into the holes.

*00:45:14*

*Schmieder:* Sure. Well, the answer, of course, is yes. At first, we didn't see anything, and I have to say I was surprised. I kind of expected to find anchors, and shipwrecks, and skeletons, and whatever. But, we didn't see anything. It seemed to be just the community, the natural community, the plants and animals that live there; and that surprised me. As we did more dives, and I became more familiar

with – and we started looking more carefully, and we started seeing debris. A lot of it was – or very often, we would see the lead balls from fishermen's weight. Attached to that, often, was the monofilament line, and sometimes loose hooks flying around on the ends of those lines. I can't say that it was in – that was really totally wrapped-up in lines.

I've dived a place off of Baja called Rocas Alijos, also what we consider an isolated underwater island, and one of the pinnacles there was wrapped up in so much monofilament, it would have been dangerous to even come close to it. And you can't see that monofilament in the water. Cordell Bank was not like that. Now and then we would see a boat anchor, maybe a fishing pole, some of those lead balls, some monofilament. Not terribly often, but often enough for me to be disturbed, because I would see a lot of broken hydrocoral. And I felt that it was not natural process – it was not fish bumping into it in the night. They don't do that.

To a great extent, this debris was getting covered over by the organisms, by the cover. So, imagine that some fisherman loses his tackle box, and it sinks to the bottom. Well, suddenly there's a chunk of surface that's unoccupied, and the organisms that live there have no choice. They gleefully jump up and colonize it. The water is just – it's a soup of – they're called propagules. These are larvae, or other, you know, nascent organisms that are capable of growing into an adult large organism, if they find some substrate. Almost all of them don't. They float away and they die. It's an island after all. But, some of them do.

And so, whenever there's a new piece of surface, it gets very readily colonized. And because of that, when you see Cordell Bank on the shallow points, it's not like a desert with a bunch of junk. This is not an automobile junkyard visually, even though I suspect that there's a lot more junk than we would see visually, because it gets covered. Same happens in the Caribbean, or other places where there are coral reefs. You know, the old Spanish ships, to a great extent, have been just completely smothered in coral. It doesn't happen to that extent out here, but it's the same process.

*Livingston:* Any other debris that would not have been related to fishing? For instance, something that might have been dumped out of a ship?

*Schmieder:* No, I don't think so. You know, the Cordell Bank has been a target for fishermen, sport fishing out of Bodega Bay, sometimes out of San Francisco. And this activity is one of taking fishing lines with lead weights on it, and banging around, and feeling for the bottom, because that's where the ling-cod, and the other rock-fish are. If you were to dump something randomly, probably it would not land on a place that we had access to as divers. They are so tiny. It would fall somewhere else. And maybe the submersible videos, or ROVs if that can be deployed, will reveal those kinds of things.

There was one exception that was really significant to us, but we didn't collect it as divers. We hung around Bodega Bay a lot, and people would talk to us about Cordell – we would try and engage people about Cordell Bank. I'll tell you a little funny anecdote about that after I tell you this. We were sitting at a restaurant having a sandwich or something, and someone came up with a bit of a pot. This was a pottery jug. And said, "I got this on Cordell Bank. What is it?" And we didn't know exactly what it was, but we surmised that it was Chinese, and that it was utilitarian. This was no great museum quality discovery – well, that is, art museum quality discovery. And so, I subsequently took it off to – and found some experts who knew what they were, and said, "Oh, yes, we recognize this." This was a jug made in thousands, many tens of thousands, and brought with Chinese when they came across the Pacific.

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And it would contain oil, or perfumes, or other things that could be poured out of this jug. It was about one liter volume jug. And then they would throw it over. And this was one of those. So it – and others, essentially identical, had been found at China Camp, and other places on land where the Chinese had worked.

*Livingston:* Why wouldn't it be covered with - ?

*Schmieder:* Well, that's a really good observation question. The rate of sedimentation is probably so low over geologic time, it's sufficient

to bury things maybe hundreds and thousands of feet deep. After all, that's how we get sedimentary deposits. But in historic time, since the discovery of Cordell Bank, and certainly the incursion of population from Asia into California across Cordell Bank, unknowingly, any items that might've been dropped in the last hundred years are probably just sitting down on the bottom, maybe looking a little dusty, but probably right there; just uncovered and waiting to be observed.

*Livingston:* Now, you had an anecdote about Bodega Bay?

*Schmieder:* Oh, yeah. *(Laughter)* Thank you. We made our first dive in 1978. And in those years, I was vigorously pursuing any lead about information about Cordell Bank, including anecdotes, and other people who conceivably might have dived out there. Because, we believed, with some justification, that we were the first humans ever to see Cordell Bank. I would be the first person to see Cordell Bank. So, in part of doing that, part of what I did was I tracked around Bodega Bay, and I would just grab somebody randomly out on the street, a fisherman, or somebody in a restaurant who looked like he would be willing to talk. And I would say, "Do you know anything about Cordell Bank?"

And generally, they would say, "Oh, yeah, well – yeah, we go out fishing now and then," stuff like that. So, this one guy, who was a fisherman, apparently would go out on the sport fishing trips, and he seemed more willing than others to talk. So, we talked for half an hour or so. And I asked him, "Did you ever recover anything? Did you ever pull up anything unusual?" And he screwed up his face, and he says, "Ah, let's see. What do you mean unusual? You mean, like, unusual?" I said, "Yeah, unusual." He says, "Nah, not really. Let's see, I pulled up a torpedo once. I don't know, you think that's unusual?" I said, "Yeah, that's unusual." He said, "Well, yeah, we pulled up an airplane, too." I said, "Well, that's pretty unusual." I said, "Well, did you ever hear of anybody else – any unusual things happening out there?" He said, "Oh, my God. Oh, my God. The craziest thing, last year – you won't believe this. There were some crazy people out there diving." *(Laughter)* And it had been us from the previous year, but I did not

tell him that it was us. *(Laughter)* Whoever he was, I've forgotten now, had no idea that he was talking to the crazies.

But, he editorialized. He said, "Oh, my God, those crazy people, I would never dive out there. That's shark city. That's where they live." And I just kept quiet and thanked him profusely for his information.

*Livingston:* You proved him wrong about the sharks, we hope?

*Schmieder:* Yes, I think that's right. Yeah. There are sharks out there, but not sharks that were dangerous to us, that we know about.

*Livingston:* That's good. Now, the holes that you found?

*Schmieder:* Oh, yeah.

*Livingston:* Could you discuss that?

*00:54:45*

*Schmieder:* Well, let me set the stage, briefly, for that discovery, which changed our mental/emotional state. We believed all this time, as I preached to my group, that we were explorers. Every time we saw something, we were the first humans ever to see it. This stimulated the group. This salved my hunger for doing exploratory work, as I described in a previous session. And was a carpet underlying everything that we did. Then, we made a dive on – I think it was 1981 – on the shallow pinnacle that we had discovered, a shallow ridge, on the northeast corner. And what we discovered, and got excellent photographs of, was a hole that was about a meter in diameter, and probably two or three meters deep, and almost perfectly a right circular cylinder. Almost perfectly round, and with a flat bottom. And I instantly said, "That cannot be a natural feature." Now I'm aware of potholes, they're ground by rocks. I've seen them many places in Hawaii, for instance. You get a boulder, and it grinds around with the surf. And it can drill a hole. But, that's not what happened here.

The location of this hole was right at the shallowest point on a razor-sharp ridge, right on the razor's edge. Imagine a razor-blade,

and now you're going to drill a hole in it. You're more likely to drill a hole, you know, on the side somewhere, or – you know, on an edge, and it's gonna be an irregular, imperfect hole. This was smack on the razor's edge. It was smack straight down, an exactly right circular cylinder. So, as I have spoken and written, apparently, obviously, somebody with a lot of resources and a lot of motivation went out there and made that hole. At that time, we knew of only one such hole.

As we carried on our diving that year, and subsequent years, we discovered more of those holes, including some that were much larger, and much less perfectly circular, but still, to my eyes at least – and it's documented in the photos – in the book there are, I think, six or so photographs – clearly not natural features. These were man-made. What happened to us? The team, after that first dive when we discovered the hole, we just went – we finished and we went home. And a week or two later, we kinda compared notes, and we found that all of us, including myself, had experienced real depression, real pensiveness about this. We were very tentative. We were very unsettled about this observation.

We didn't know what it meant. We didn't know if we were in danger. And we didn't know what to do about it. It certainly violated the concept that we were the first humans ever to see Cordell Bank. And so, as I said a few minutes ago, it just qualitatively changed our image of the project we were doing. So, there was an issue of what to do about these holes, if anything. And there was an issue, and so I'll describe that. Let me take just a breath. Let me just get a drink, and then ask me to take it up again, and I will carry on with this story, because it is interesting.

Okay, so I'm going to now sort of complete, or give you the story of what happened after we discovered the first hole, and how I feel I pieced together what I think is a rational explanation for them, supported by data from several independent sources, which for me, makes it credible. So, after the discovery of the first hole, we were very disturbed. I said we were depressed. We were pensive. We were kind of sad. For me, as expedition leader, I had a task. The task was to know what it was those holes were about. For instance, one possibility is that there was something dangerous in

that hole. I shouldn't say, "Those holes" yet, because we hadn't discovered them all, yet.

*01:00:02*

Was there anything threatening in that hole? The bottom of that hole was filled with some sort of debris, but we were frightened from even digging into that, for fear there would be something – something terrible. Now, what could it possibly be? I don't know. That was part of our fear about the unknown. So, I started tracking into every source that I could to try and get some information about it. And I had a friend, Hal, who had obtained for one dollar the tektite habitat, and for a while had it on display down at Fort Mason. And Hal was interested in collaborating with my group to document the exploration of Cordell Bank.

Hal was quite a mysterious guy to me, but he seemed to be very knowledgeable about inside information. So, I asked Hal – I showed Hal a picture, the photograph of the first hole that we discovered, which is the clearest example. And I said, "Hal, do you know anything about this?" And he paused for a very long time. He clearly knew, but did not want to say. But, then he finally capitulated, and said, "Yes, I do." He said, "Those holes were made by commercial divers for the U.S. Navy in the 1960s. And I said, "Any of those commercial divers still around?" And he said, "Yes." And he gave me the name of one such person.

That person was an employee of a commercial dive shop in Oakland, and I instantly tracked off and found him. And his first response to me was, "I can't tell you anything about that." And so, I cajoled, and I – you know, I sort of pulled teeth. I did everything I could to get him to talk, and eventually he loosened up a little bit. And he said, "Yeah, we – several of us commercial divers were contracted by the Navy. And we went out to Cordell Bank, and we made those holes for them to put instruments in." "Well, how'd you make those holes," I said. He said, "With shaped explosive charges." I said, "How many are there?" He said, "There are holes all over." "All over what?" He said, "There are holes all over Cordell Bank, and all over other banks all up and down the coast." I said, "What? You mean this is a big project? What kind of instruments? Were they measuring water temperature?" "Oh,

no," he said, "those were hydrophones. They were listening for submarines."

And that's pretty much the whole story that I got from him, but it was very, very credible because of the way he described it to me. I did not believe for one second that he was trying to impress me. He was trying to hide it from me. He said, "I'm legally restrained from talking to you about this. This is classified." I said, "I have a security clearance. I work for a national weapons laboratory. I have a security clearance, and I have a need to know, because I have divers that I'm taking out there. I need to know if there's anything dangerous. Is there radioactive material in there?" And he said, "No longer." *(Laughter)*

And so I felt even more unsettled than I did before, because for all I knew, since this was part of military and defense, and was clearly a clandestine project, that it was possible that there were things in there, even though he said, "No longer" – I think he qualified it. He says, "Not to my knowledge," or something like that.

It was not enough to assure me that these – that this hole, and the ones we subsequently found were benign. I thought, maybe, if we dug into that, we would trip a land-mine, and the thing would explode, or something like that. Now, some of that is in hindsight or retrospect, needlessly melodramatic. But, at the time, I took it all very seriously. So, what I did was, I used resources that I had available to me working in a weapons lab, quietly, to find out where this project might have originated. And it turns out that it originated in San Diego. There's a Navy group, it's called Group-something – Group-One, or something like that in San Diego. So, I drove down there. And I went in the front door with my photographs of this hole.

*01:05:30*

And I said, "Good afternoon, I'm Bob Schmieder. I have a group. We've been exploring Cordell Bank with divers, and we have run into a situation that I need your help with. I need your advice on this, because there is a safety issue involved, potentially also national security interest involved. I work for a national lab. I have a security clearance. So, I'm hoping that you will talk with me about it." I'm kind of reconstructing the conversation that I

had with the young officer who met me at the reception area. And he looked at my photographs, and he was obviously startled. And he said, "Could you wait for just a minute?" And he went out of the room with the photograph, and he was gone for 20 or 30 minutes. And he came back and he said, "Where did you get this?" I said, "We took it." He said, "You mean you were diving on Cordell Bank?" I said, "Yes. We're – we're diving. We're exploring Cordell Bank. This is a scientific project. We are describing it." And he left the room, again.

And he came back another 15-20 minutes later, and this cycle was repeated over two or three hours. After about an hour and a half, he came back and he said – and I'm practically quoting him – he said, "I need to tell you that you might not be allowed to leave here this afternoon, today." I said, "You mean I'm going to be arrested or confined?" He said, "I don't want to say anymore. I need you to wait here." *(Laughter)* And I – my feelings were in bifurcation. I was scared, and I was elated, because I knew that, right down the hall, he was talking with somebody who knew about Cordell Bank. And in those days, finding anybody who had ever heard of Cordell Bank was a great triumph, because there was almost nobody. So, I was thrilled that I had found the right office, and I was panicked – not panicked – I was frightened that I was in some kind of legal trouble.

And I was a bit bewildered, but I was secure in my motive, and my procedure. I went to them as a safety issue. I have divers in the water. Their safety is at issue here. And as far as I know, we are legally entitled to do this until somebody else – somebody tells me that we cannot. And after about three hours, he came out and he handed me my photograph, and he said, "Thank you very much, you're free to go." And I went – I did a double-take, and I said, "Well, what can you tell me about the – you know, about this project and what happened?" He said, "Nothing. I don't know anything about it." He said, "You're free to go." I said, "I'm – am I being – said, 'You're going now', is that – am I being sort of ejected or something like that?" I didn't use that word. And he said, "Yeah, you need to leave." And as I walked out of the building, I realized that I had learned one thing, and that was I had not learned one other thing. They were so good.

But, there was even a name of the project. It slips my mind at the moment, but there was a name of that project. Okay, so after that, I went back to my commercial diver and I talked with him. And I told him that interaction. And then, I talked with Hal, my friend with the tektite. And I talked to some other people. And I also did a little more research in the lab's libraries. These were files accessible to me with my security clearance. And here's the story that I pieced together, which seems to explain it. And by this time, a year or so later, we had discovered in our diving – we had discovered, I don't know, maybe a dozen of these holes, in various places, on various ridges, on Cordell Bank.

And I was told by this diver, that they were in other places. But, we didn't see them in any other places like Point Sur. Although, he had mentioned Point Sur as well. So, here is the story, as I understand it, and I believe it's consistent, and I believe it's correct. During the 1960s, the Department of Defense funded a research program, pilot program, to install hydrophones. In fact, it was a whole chain of connected hydrophones, connected by cables on the sea floor, to listen to traffic out there, including ship traffic as well as possibly submarine traffic. And this is part of the defense of the United States.

*01:10:46*

So, there's nothing surprising or unexpected about the military carrying out secret projects. That's what they are chartered to do. They should be doing that. And this is what they did, but no one knew about it. These were instruments that were placed in holes that were constructed for their protection, because they had to be powered by some sort of a power source; not from a cable from the shore, but a local power source for about one year of running time. And the power source was an RTG, that's a Radio Thermal Generator. It's a small, electric generator, powered by radio-isotopes. These are used on spacecraft. How do spacecraft go to Jupiter, and Saturn? They have an RTG onboard. Because the radioactive materials last for hundreds of years, and they provide enough electric power generation to power these.

So, these instruments, these hydrophones, were powered by RTGs. The RTGs were manufactured under contract by Sandia National

Laboratories, where I worked. That's how I was able to get access to the information. So, I actually saw the design, the drawings for these RTGs. And this came, of course, in – like I said, independent source of information. And they operated this project for about a year or so, until they – the project – the funding was stopped, and any activity was stopped. The instruments were left there, because apparently there was no motivation to remove them. I subsequently found in the records that they were removed from Cordell Bank on October 21st, 1978, one day before we made our very first dive on Cordell Bank.

So, apparently, the Navy – now I'm inferring something. This is an inference. Because there had been newspaper publicity about – we were going to go to Cordell Bank and explore it as divers, that was an article that Skip Garretson had written in the *Oakland Tribune* – the speculation – my inference is that the Navy saw that we were going to go there, said, "Wait a minute. We can't have those guys fooling around with our RTGs that are still sitting out there", and they went out and removed them, one day before we were there.

Now, this whole story may not be true, but it is consistent, and I deal with data that – and this is my career – when you get data coming from various sources that are consistent like that, it's much tougher to find some alternative explanation. One day in advance? After 15 years of no activity? That's more than a coincidence. That strains credibility to be a coincidence. It could be. So, finally, after, you know, all these years of pulling this story together, it seems to be reasonable. It's not sinister. It seems to hang together. It's consistent, and it's all part of a very interesting picture of what goes out there. Sadly, it turns out, apparently, I am not the first human ever to see Cordell Bank. It was the commercial divers, Frank was his name, and the other – I spoke to another person briefly – who were the first humans, actually, to see Cordell Bank. And that's the story of the holes.

*01:15:00*

*Livingston:* Is there an indication of how many of these instruments were there on Cordell Bank?

*Schmieder:* We found probably as many as a dozen, but some of those dozen are poorly – are not as clear. You look at the pictures in the book, those are maybe the most clear examples. And when you look at those pictures, I think it's quite easy to agree, well, gee whiz, this looks like a set of holes in the rocks. I mean, it's not an accident. Something happened there, with some – either it was some humans deliberate motivation, or it was God playing – fiddling with us, or something. So, let's say that there were – you could easily imagine that they tried to make these holes with their explosives, and maybe it didn't work every time. And so, they weren't good enough for the Navy. The Navy didn't like them. But, the one that we discovered first, which was the most clear example, was perfectly placed. Maybe it wasn't the first one. Maybe it was the last one they made. They finally got it right, or something like that. And so, the Navy said, "Okay, yeah, let's do that."

But, I was told, and I believe, that this project was done all up and down the coast as part of a much larger project. So, even though I've never heard of reports of holes on, say, the Point Sur Bank, or Tanner Bank, or Cortez Bank, or these other places, I do tend to believe that the project was done there as well. There are probably the holes there. It's just the remnants. It's the footprint of a project that was sensible at the time, appropriate at the time. But, because of the mystery surrounding it, really caused us to have a significant wiggle, or warp in our psychological and project timeline.

*Livingston:* About the timeline for figuring this out – did you continue to dive when it was still a mystery?

*Schmieder:* When we discovered the first hole, I went into concentration mode to solve that, because I was not a – what I told the team was, "We're not going diving out there unless – until I get an answer." Are we going to run into something dangerous in those holes? Because, we couldn't resist going there, but now, everywhere on the bank was suspect. The whole place was a bit of a fright to us, knowing that we were not the first humans walking into a virgin area. We were afraid of everything. So, I said, "We're not gonna do anything." But, within a fairly short time, I talked with Hal. I talked with Frank the diver. I talked with the Navy guys. And I

started to believe this picture that the project was long ago, that there's nothing out there that's going to really be a threat to us. And we went on diving, and we got kind of comfortable, as you do with things. We kind of got excited, and interested, and we were thrilled when we would discover a new hole.

*Livingston:* Okay. Thank you. Let's take a break.

*[01:18:35, end of audio file 3. Begin audio file "CBNMS Schmieder 4" at 00:00:00]*

*Livingston:* We're continuing in the afternoon, July 9, 2009. This is the second part of the second session of the interview with Bob Schmieder. Coming back, a few more questions about diving the bank: It's a fairly large area, but you're talking about these smaller pinnacles, so to speak, and ridges. Can you give a brief overview of how many of those places you think you dived, some sort of geographical reference? I recall you named one, even. It was Craine's Point. Is there a way you could describe the places you have dived?

*Schmieder:* Sure. The first one, of course, was in the southern – it was in the bottom, if you like, or the southern tip of the oval that kind of just encircles Cordell Bank, and that was a mark on the chart at 20 fathoms or 120 feet. That's where we did our first dive, and we've done multiple dives there, and just to give it a reference, I started calling it Craine's Point for Mike Craine, the skipper of the boat that took us out the first time.

It has a characteristic shape or depth profile when you go across it in a boat with a depth sounder, and it has a ridge. It seems rather flat on the north side. Then it rises up a ways, and then it falls abruptly to a rather flat place. So this profile is easily recognizable, so when we would search for it, we would be looking for that profile, and when we found it, we knew that we had found this place.

The ridge itself is maybe 100 feet long with a profile like that, so it was relatively easy to find in spite of our experience of having such difficulty finding it. Nowadays, with GPS navigation, you

could go right there, steam across it, and you would see that profile.

So that's where the first specimens came from that led to the beginnings of the species list. Then after that first success, we spent a fair amount of our time doing surveys, so we would run as straight lines as we could run, which were a little wiggly, looking for shallow places, and we would get a hint about a shallow place, because as I was plotting the position of the vessel, I would notice that we were suddenly off to the side, and then a few minutes later we would be suddenly back on our line again. In other words, we had a little bit of a side shift and then back again.

Then we would come back on an adjacent line or nearby, and none of this was very precise, but it was enough to be recognizable. We would be thrown out the other way, a bit of a shift out the other way. When you stare at that long enough, you realize there is what looks like a high place in the ocean that's pushing you away. It's a mountain or a high barrier, and you're deflecting around it, sort of like a pinball would be deflected off of a mountain.

Well, the water isn't piled up. The water is flat, but the current, when there's a current, the current is being deflected, so the water is being deflected to the left and the right of the central flow line, and the vessel went with it. So that was an indicator that we had a shallow place, and once we got an indication, we would go back to that place.

We found if the vessel went too slow, we would never see it. We would never get to a shallow place. But if we would run fast enough, maybe six, seven knots instead of one or two, where we were trying to find it by hovering over it, instead we would run across it and, boink, there would be a shallow place.

So once we kind of figured that out, we essentially surveyed on a fairly coarse grid the entire bank, the central part of the bank, and in doing so we discovered a place in the center that was about 22 fathoms that was divable for us. It turns out to be a rather big, very flat plateau that shows prominently as a polygonal terrace on the bank. Then the shallowest place, which is in the northeast corner

that turns out to be about 115 feet, 19 and a half fathoms, and we dived on that repeatedly, and it forms the most characteristic place, and that's where we discovered the first hole that we discovered.

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To the west of that shallow place is another sort of mountain that leaps out of a flat plane and plateau, and we dived on that only once. It's also about 22 fathoms. In assigning names, I think I gave that one the name Tor Hakluyt. Hakluyt was a mapmaker from the 16th Century. Tor means mountain.

And then further to the west is a point which I think is one of the most exquisitely beautiful and interesting places. We did not dive on that enough from my point of view. I wish I could see that more. It is extremely steep-sided and complex. It's like a structure that's been constructed. It seems to jut out. I don't thin it actually overhangs, but as we would swim around it, it wasn't simple to comprehend its geometry.

It had ridges, and it had gullies, and it had the rock slabs that overhung this place or that place and big cracks, a really complex place, and among the densest and most interesting of the cover of the plants and animals, and that also was at about 20 fathoms, 21 fathoms or so. Between all of those places, we knew about the first one to begin with and discovered the others, which were subsequently confirmed by the high resolution surveys that Davidson in 1986 and then the even higher resolution surveys done in the 1990s.

*Livingston:* That parallels, in a sense, a question that we had for later that I think fits now: on the subsequent dives – you've explained in quite a bit of detail the first dive, and you have referred to the dives that followed that – could you tell us a little about those dives? So, for instance, were you looking for a particular place the next time you went out, or were you planning to revisit a place you'd been before? How does that relate to these areas that you just described?

*Schmieder:* Yeah, the question sort of is what strategy would we use to pick targets, and, yeah, I understand your question. It was, shall we say, an adaptable strategy or adapt*ed*. When we had a scheduled diving

expedition, I would have a target, a tentative target, but sometimes it occurred that maybe the conditions were different from those that we expected. So maybe the sea was higher, and we knew that this place would be tougher to find, so we would decide on the spot to go to an easier place to find. Because of the depth profile, we could find it more easily.

Very often or numerous times, we would survey, do surveys, and we would find a shallow place, and we would dive on it on the spot on that day. This happened, I think, with at least two of those other new places that we found. We would say, "Holy smokes, we've got a shallow place here. Let's dive," and we would do that, and we would do that all in one day.

In retrospect, that seems rather miraculous to me that we were able to get out there, do those surveys, and everybody except myself was sick. I wasn't sick, because I had a job to do, and it was very tough. The divers had to overcome their exhaustion, their boredom, their sickness, and we would establish a line and carry out several dives in one day. Those were really good days.

*Livingston:* Is there a way you could describe almost chronologically the dives from beginning to end? Not that you can't skip one or something, but to give a sense that we started out doing one dive. Then we would do three or four or six dives per season.

*Schmieder:* Well, what we scheduled was three diving expeditions in the fall, and I think we typically would succeed on two, maybe, of those weekends, three possibly, when we were lucky. On a good weekend dive, we would have three diving days. We certainly didn't get those all the time. On each of those successful diving days, we would get as many as five teams of three divers in, one after another, one team at a time, and that completed the day.

*00:10:25*

And on a number of weekends, we would have all 3 days and all 5 dive teams times 3 divers or 15 divers. In fact, sometimes it was 6 teams, 18 divers, 6 dive teams, 3 divers times 3 days in one weekend. That meant a lot of pictures and a lot of specimens, so very productive events like that.

We didn't succeed in doing that, partially because of the sea state. It's unpredictable. In one case, on one day we had a problem with a diver who had an emergency on the bottom, made an emergency ascent, and I decided to cancel the diving for that day. We came back the next day and had a beautiful day and a very successful series of dives. So that kind of shows you how the statistics of the diving went, and you can multiple all those together, and that's how many we did.

In terms of the flow from the first year to the last year, we started at the 20-fathom mark on the chart that we knew that attracted us out there, but very quickly we got into the surveying. Now, that was 1978. In 1979, we had only one dive team, and I described that before. It was enough to keep the project going, but it didn't produce much useful data, the first photographs so we could say, "We now have photographs," and a few specimens but from too deep to be of any great practical use.

But the following year, '80, then '81, '82, '83, and into '84-'85, those were years where we had the strategy. We had the team. We had plenty of people. We had plenty of equipment. We had a good platform, and we carried out the dives as I described them.

We sort of moved according to my feeling for, "Have we covered this? What's the competition between wanting to go back and see something that we've seen before because it's reliable? We know we could do it. There were more things we wanted to see." That competes with, "Let's go to someplace new that we've never seen, but there's a risk that we will not succeed in doing that." There were just judgment compromises all the way.

*Livingston:* And you mentioned '83, '84, '85. How long did these expeditions go on?

*Schmieder:* The last in that major series was in 1985, and then we got interested – by that time, the sanctuary nomination was well underway. The species list was starting to saturate. That is, it was approaching sort of a constant list, although if we had worked as hard in the last years as we worked in the first years, we probably

could have extended the species list by another 100 or 2 species, 100 or 200 species.

But by that time we were getting interested in going to other places to try and elaborate this idea that Cordell Bank is an island, an underwater island, so the bank of Point Sur was a very attractive target, and in 1987, then '88 and '89, I took the boat down to – by that time, I had my own boat, the *Cordell Explorer,* and we took it down to Monterey and then to Point Sur, and we did our basically the similar kind of series of expeditions out to this bank, collected specimens, passed them to many of the same specialists that we had been passing the Cordell specimens, collecting their identifications, doing our own surveys, and we did exactly the same on that bank that we did at Cordell Bank.

We surveyed back and forth. We got rather good at it, recording depths and positions, and identifying, and we discovered all the shallow points there and dived on all of them, and the description of those points and those dives is very, very similar to the experience and the physical layout at Cordell Bank. They are very comparable. As I described earlier here, they are sufficiently similar that a comparison makes sense.

*00:15:15*

*Livingston:* Thank you. Well, moving along to Cordell Expeditions, could you give us a brief rundown on the formation of Cordell Expeditions as a non-profit entity?

*Schmieder:* I described before that when I pulled the project together, we called it Cordell Bank Expeditions. It seemed perfectly sensible, but by 1980 or so, it was clear to me – even though it may not have been clear to anybody else in the project, it was clear to me that what I wanted to do was go beyond Cordell Bank. That is, I saw – once the sanctuary was nominated, that became a project with an end on it. Rather than a lifetime of personal exploration of Cordell Bank, this became – it started transferring the ownership to something else, namely a government entity, so that when the final establishment of the sanctuary was done, essentially I had no more ownership other than intellectual ownership in that.

So, looking toward broadening what it was we were going to do – and what I wanted to do was explore and describe other places on the California coast. After all, we had a great team. We now had a boat. I'm sorry, that was a little later, but we had access to a boat, and we had the procedures, so I looked into and then established a non-profit organization and simply called it Cordell Expeditions.

For a while, I toyed with the idea of forming the Cordell Society, and this is unabashedly a copy of the Cousteau Society. The basic idea is that the Cordell Society would be an organization, a membership-volunteer kind of organization that would go do expeditions to remote places with the driving purpose to describe them, to enable rational management and protection of the resource. That was our charter.

But the Cordell Society as an organization never flew, and just as the name Cordell Bank Expeditions persisted and still persists – things like photo credits and so on, we still see the name Cordell Bank Expeditions. The documents that I wrote and sort of the things that I – sort of the ideas that I circulated about the Cordell Society, once in a while someone asks me, "Well, how goes it with the Cordell Society?" And so the lesson of this is you want to be very careful what you say, because whatever you say, somebody always remembers it and forever.

But it became the Cordell Expeditions, and we completed the exploration and description of Cordell Bank by 1985. Then we went on to Point Sur. We dived at Middle Farallon and a lot at North Farallones and made some discoveries there, and after that, Cordell Expeditions as the sort of umbrella, parent organization was the lead in a whole bunch of other expedition projects, Rocas Alijos off the Baja coast, Antarctica, Easter Island, and so on.

*Livingston:* You mentioned a dive on Cordell Bank in 1995, so what drew you back ten years later?

*Schmieder:* Addiction, I guess. It was stimulated by a person who was a very energetic and very competent diver whom I got to know after 1985, after our main interval there, and he was very keen on diving at Cordell Bank, and so I toyed with the idea of going back. After

all, there would be really good motivation for going, namely to compare ten years later what we would see, and I was not so much interested in just the pleasure, and it's a lot of work having fun like that. I was not so much interested in just the adventure of going to dive there. Maybe he was. I think he probably was interested in that, but for me the attraction was the opportunity to make some comparisons over a ten-year interval.

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So we, in fact, prepared, and I pulled some of the same team together. We got some new people, and we went out and dived on Cordell Bank. It was quite successful. We had really good conditions, extraordinarily good conditions.

Unfortunately, because we didn't have the ongoing momentum of a larger project and a larger group of people, the collections were not as extensive or as well documented. The debriefing was not as well done. Did as well as we could do, but I think not everybody really – it didn't have the same character that it had had before, and because of that, the information that resulted from it was weaker.

We were able to show consistency, collect specimens, and so on, but we can't point to it as a source of major new discoveries, and we essentially dived on the one place that we had dived before, the shallowest point, which is easy to find now and the most, I guess, the most interesting at this point. It's certainly the place I took Jean-Michel Cousteau in 2005, when he and his team went to dive there.

*Livingston:* By that time, 1995, did you know of other people diving Cordell Bank?

*Schmieder:* As far as I know, there is only one other group that's ever dived on Cordell Bank, and that's Cousteau's group, and I was there with them. I've heard a lot of people claim that they've dived on Cordell Bank. My usual response is, "Really? How deep were you diving?" But when they say, "Oh, really deep. It was 60 or 80 feet," I know that they are mistaken. It's somewhere else they were diving.

I don't know of anybody. I've heard stories. I think maybe Jenny related a story of somebody who attempted to dive there but not very successfully, so it may depend on what you mean by a dive. For me, a dive is you get the people down. You get to the bottom. Get their job done. You get them back safely, healthy, and alive, and so on. That to me is a dive.

*Livingston:* Well, you mentioned diving with Cousteau in 2005.

*Schmieder:* Yes.

*Livingston:* Can you briefly tell us that story?

*Schmieder:* Yeah, it was such a pleasure. It was more than just the pleasure of the moment. It was validation to a great extent, independent of the sanctuary, the existence of the sanctuary, which is a fantastic validation of what we had done. But Cousteau and his group, Ocean Futures from Santa Barbara, was pulling together a video documentary of all of the National Marine Sanctuaries, 11 or 13 of them. So he and his team had been going to every sanctuary, diving, and video documenting this, and it was pulled together as a very handsome two-part, two-hour PBS documentary called "America's Underwater Treasures."

So Cordell Bank was one of the sanctuaries, and they contacted me many months before and asked, probably with the guidance from Jenny [Stock] and Dan [Howard] and the sanctuary people, that it might be useful to have me involved with them because of my experience. And, besides, I had been a friend of Jean-Michel Cousteau for many years, anyway. I had seen him, I guess, two years before at a NASA conference in Monterey.

So I got in contact with the expedition leader, Cousteau's expedition leader. It turns out, ironically, he and Jean-Michel and the others were in the Bay Area with their boat in the early eighties while we were going out to the Farallones. In fact, it was 1986, and we interacted with them on their boat, on the *Halcyon*, and it was still the same expedition leader, so I interacted with him.

We planned to go out to Cordell Bank, and I would go with them, which we did. And so the project, that was successful, although there was a bit of irony and a bit of satisfaction on my part and pride in my own team. The Cousteau people are fantastic professionals in what they do, but Cordell Bank is different from anything they had ever done before, and I think that they had not understood in advance how difficult it is to dive there, even how difficult it is to find the places to dive there.

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I knew how tiny these places are, 20 feet across and 120 feet down in unknown currents that might reverse below the surface. How do you establish a descent line there? And this was far more difficult than any of the other sanctuaries, presented more difficulties than any of the other sanctuaries had presented to them.

So it was very good that I was on board, and they did allow me – and I felt privileged – allow me to set up the vessel and say, "Okay, drop the anchor now," and this is a technical procedure. I described it in the earlier part of the talk here, the interview, where we can establish.

So I put the anchor right on the middle of the shallowest ridge, exactly where I wanted it. Probably I was ten feet away from where I thought it would be. I actually was quite proud of it, but it was the result of a lot of experience, and Cousteau's team did their dives. We had to come back another day. The day got too late to complete that.

It took several more days to get the weather in alignment, then a successful day of diving and videotaping, and they stitched it into the program, which is magnificent. So I came away with a great deal of pride in my team, which had been able to accomplish this when Cousteau, as well as they were prepared, still had great difficulty, and they acknowledged that this was very difficult for them. So that was an affirmation that what we had done over those years had not been easy and that we had had to have a really good team to do it, and we did. And we did.

*Livingston:* Jumping back, I wanted to ask about the situation of getting your boat. Could you tell the story of getting the *Cordell Explorer*?

*Schmieder:* Sure. I don't think it's terribly interesting, it's pretty straightforward. We had used several boats. We started with party fishing boats from Bodega Bay, and I was constantly soliciting boats, because that was critical to what we wanted to do.

At one point, I connected with a boat in Berkeley, which was a previous shrimp fishing boat, 67 feet long at the water line, and I thought, "This is about the right size for the team of divers." We wanted to have about 15 divers or so. I was able to come into agreement with the fellow who owned it, Breck Greene, and for quite nominal cost, essentially the fuel cost, he would take us out, and he did over the years – I think it started in '81 and all the way through '85.

As time went on, I think everyone transitioned out of the early on intense romance into more of a feeling like, "Gee whiz, this is really a lot of work. Do I really want to do this?" This is quite natural in all relationships and all circumstances, and we experienced that, including Breck experienced that, and so the price for using his boat went up and up and up, and I kept saying, "Okay, Breck. Okay, Breck," you know, and we would go out.

We also suffered a little, because he would bring us up to Drakes Bay and go out in the morning, and he would, what I thought was almost slightly deliberately, run too close to the head, where the waves are always very high, and he would say, "It's way too rough. We can't do this," and turn around and go back, and so it became increasingly difficult to get Breck to do what we needed to be done, and at one point I said, "I'm finished with this. I'm gonna get my own boat," with a few other words.

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And so I had a number of friends, one of whom had a boat in Bodega Bay. He had several. He had taken us out to Cordell Bank, diving, on a successful dive trip before, Wilson Landrum, and he had this boat called the *NanB 2*, and he said, "Boy, have I got a deal for you," and he sold it to me for $6,000.

The seagulls owned it at that time. It was a wreck. I thought it was beautiful. He got it down to the Bay Area, and we spent one

full year refurbishing it, almost all new woodwork, took all the electrical out, all the fishing hydraulics, everything off, refurbished it, and boy, did it shine at the end of the year. We took it out to the Farallones, and that's when I met the Cousteau people out on that maiden voyage, and I've used it ever since for either the expedition projects off the coast, down to Point Sur, out to the Farallones, and what I do with it mostly now is I take students out from classes at nature centers on education/research cruises in the Bay Area and up the river. In fact, I have three trips tomorrow, Saturday, and Sunday.

*Livingston:* Where is she berthed?

*Schmieder:* Berkeley.

*Livingston:* If you could describe your relationship with the science community and how you dealt with all these specimens you were bringing back, and I think I'd like to actually start that with how did you know what to collect and bring back?

*Schmieder:* Okay, part of it is easy to understand, because I've already described this is an opportunistic exploratory project. It is not systematic, statistically meaningful research. That takes a different kind of skills and resources, but what was important here was to strive for as great a diversity in the documentation as possible. What is going to be there? We wanted to collect as many different kinds of things as possible, and that was my instructions to the team, and usually it worked well.

Now, how did I know what to look for? I didn't need to know what to look for. We were going to look for and collect and document in whatever way we could anything that we didn't have before. That's the diversity, and so it was not necessary for us to be marine biologists in any sense.

After all, biology now is done to a great extent in a laboratory and has to do with complex biochemical dynamic systems and so on. Here it's much simpler. You see something you haven't seen before. You grab it and put it in your bag and take it home. What happens after that I'll describe in a moment.

For us in the field, it was relatively simple. It was rape, pillage, plunder, and so on. Could we hurt the bank? No, not significant, in negligible, trivial, non-existent harm, and what I argue regularly is whatever tiny amount of harm we ever did is easily eclipsed by the knowledge that we are gaining. That's what we mean by sampling, after all.

So we would come back with, on a successful expedition, perhaps three or four cubic feet solid of materials, already separated and distributed into a variety of jars, typically. We spent a lot of money on jars with black screw-on lids. What we did was we knew enough or learned enough so that we could perform a basic sort.

In no sense did anybody, including myself, attempt to claim that we were biologists or even taxonomists, but we learned enough and knew enough to know what the basic phyla are. We knew a sponge from a crab, for goodness' sake, and so we could separate these into arthropods and mollusks and porifera and cnidaria and so on, basically the major taxonomic groups, because we knew that, and we either knew it because we knew it all of our life.

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Somewhere we learned it, or we were studying the materials that we had, and we had many very fine handbooks. Dan Gotshall has a whole bunch of well illustrated books. [Joel] Hedgpeth's book, *Between Pacific Tides*, was a major important handbook. We studied those and learned enough so that we could perform an initial processing of the specimens.

We would have sorting parties in my back patio, and we would further divide as far as we could, to whatever taxonomic level we could, and we would apply unique numbered labels to each of the bottles or containers of whatever specimens they were. There were a lot of duplicates, and we got to know a lot of the species that are common, like *Corynactis* and *Allopora californica*, the California hydrocoral, and so on.

A lot of these we already knew from our sport diving. Most of them we learned as we went along, and we became rather expert at

the common species, and we use the Latin names. We almost never called them by common names, because we learned, you know, *xanthrograficum*, *Anthropleura xanthogrammica*. We learned these names, and that's what we did.

Then, once that secondary sorting at home, say, was done, I would parse these, parcel these out. I would separate these, send these to specialists, and I used both my personal knowledge of friends and friends of friends, my reading of the literature. I would find people who were the most visible specialists in an area. If they were polychaete worms, I found the person who was the polychaete expert, and I would ask other people, "Well, who knows this category?"

So, for instance, Cadet Hand popped up as one of the experts on West Coast cnideria. It used to be called coelenterates, and so I would then contact those people, tell them that we were exploring Cordell Bank. "I have specimens. This is from a previously unsampled area. Would you be interested in receiving these specimens?

"You can keep them and accession them into your collection if you wish. All I ask is for you to give me back your identifications and whatever documentation and optional comments, if you like, as well as identify any new discoveries. Discoveries would include undescribed species, depth records, range, extensions, and that sort of thing."

And so I assembled probably 25, 30, maybe more such professional specialists. Almost all of them are well known, were at the time, and many of them still are extremely well known specialists in their areas, highly visible and highly regarded in the community. Routinely I would ship them off, and they would give me back within a few weeks a list of the species with all the documentation that I asked for and the citations and so on, and usually they kept the specimens. They accessioned them into their collection.

So, for instance, specimens went to the National Museum of Natural History in Washington, D.C., this is part of the

Smithsonian. A lot of them went to Los Angeles County Museum of Natural History, Santa Barbara Museum of Natural History, the California Academy of Sciences, Bodega Marine Lab, and may other institutions around the country, some in Texas, Mary Wixton at Texas A&M University.

In some cases, they would return the specimens to me after the identifications, and so almost to this day I have had possession of them. I no longer have possession, and I will tell you what happened to them, but the result of all of that was an accumulating, ever-growing list of species identified by professional specialists in their own field.

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All of that documentation was carefully preserved. The names were extracted to form the species list, which I think ended up about 450 or so species by the time I stopped adding to it, and now forms – and we are just in the process of going back to re-encounter or to encounter these documents to provide the fully documented account of the species that were collected and identified from Cordell Bank during that period of time.

And that process worked extremely smoothly. I believe that many of the people were appreciative of the specimens. After all, in some cases there were new species described, and there are all together, believe it or not, more than 1,000 new records. These are range extensions, depth extensions, first observations, new species, new genera, and that sort of thing.

*Livingston:* Are there any undocumented specimens?

*Schmieder:* In the sense that are there any buckets that contain things that have no identification, no, there is nothing. Everything had a number, but not everything has been examined in detail, and certainly not everything has been identified. In fact, in many cases, the specialist would say, "Unidentified brown alga." Paul Silva at Berkeley would say, "Well, I have an alga here. It's new. He might say, "An undescribed species," meaning he recognizes it as something he doesn't recognize, but it's not yet described in the literature.

So it's a new species, but you can't refer to it yet, because he hasn't described it and may never. There are many, many – you know, there are a million species discovered every year or something like that or 100,000, some large number of new species discovered every year, but most of them are not described. They just recognize them as new.

*Livingston:* Earlier, you referred to going and looking at Cordell's collections. Could you talk about that?

*Schmieder:* Oh, my gosh, what an exciting time that was. It was a period of a year or two years. It was a discovery, I think, as electric as the actual physical exploration of Cordell Bank. I told you that I got my first hint about Edward Cordell from the San Rafael Civic Center, and from that I went to the Bancroft Library in Berkeley and then eventually to the National Archives, and each of these places had some documentation. In some cases, it was the original handwritten documents, say, by Edward Cordell or George Davidson to or from Cordell or about Cordell.

As I did that, every time I would come across something new, it was with trembling hands. How poetic can I be? I probably can't be poetic enough to capture my feeling at the moment. This process, which historians like yourself, Dewey, know very well, is not only exciting, but it has its own geometry. You may come to a place where you think you are at the end of your exploration here, and yet there is a little crack of light. And you follow that, and you squeeze through it, and suddenly you're in an entirely new, huge chamber of vast proportions, and that's what happened repeatedly with Cordell, exploring Cordell's life.

I would think, "Okay, I've got everything there is," and then suddenly I would find this trove of new materials, and every time I would learn something new, it would be like a birth. Besides going to the archives here, I went to Germany. Edward Cordell was born in the area around Baden, Germany, a town called Phillipsburg, in 1829, and it turns out that there is a state archives in the state. It's sort of the same kind of state as California, Arizona, and in the archives are various documents relating to not

only Edward Cordell but his family, including the report cards of Edward Cordell from his school days.

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So I know every course he was taking, every class he had. I have the reports on his discipline. Was he well behaved? No, not particularly. Did he attend classes? No, he was always absent or often not attending classes. His grades were mediocre to not-so-great, but the problem there was that as he was growing up, he was getting distracted, because Germany was having a revolution. He was getting interested in that, being sort of a liberal student kind of a person, and eventually left Germany and came to America, as I described before.

So the process of discovering that was maybe like the process of discovering the love of your life. The excitement of that is just beyond description, and I know that you know how that feels. That's the way it felt for me in discovering and sort of bringing Edward Cordell back to life.

*Livingston:* Did you say that you actually had physical specimens that you could compare notes with over the century?

*Schmieder:* Well, Cordell himself, when he discovered Cordell Bank, collected eight specimens of the bottom. He had a lead called the Stellwagen Lead. This was Stellwagen that he had worked for. Cordell had worked for Stellwagen when Stellwagen discovered Stellwagen Bank out of Boston Harbor.

So Henry Stellwagen had designed a sounding lead, and that had a little cup on the bottom that could capture some specimens. So Cordell in his log records the collection of eight such specimens during that week in June when he discovered Cordell Bank. Those specimens were put into jars and sent to the archives, to the Coast Survey Office in Washington, D.C., and now they reside – at least four of them do – reside in the National Museum of Natural History.

I found those four, or staff there on my request found those four. We don't have any indication of where the other four are, and that's what I referred to earlier when I said for about one year I had

loan of those specimens. I had them in my possession, and we ultimately opened one and examined the contents of that one, looking for those diatoms that I talked about.

*Livingston:* For the most part, were the specimens similar to what you were seeing then?

*Schmieder:* They were pretty paltry, dried-up little things. Cordell described them in the log as red, slimy things. Well that, now we know, is *Corynactis californica*, the little anemone, and, sure enough, in the jars were a few, two or three, five little dried up pea-like things, and those were undoubtedly the remains of *Corynactis*.

It was, I must say, a little disappointing. When I got the jars in the mail and looked at them, there was just sort of some dirt and dust inside. Of course, that's a totally scientifically incorrect description of what was inside, and to me it was treasure beyond measure, almost, but visually it was maybe disappointing, and someone who is not keyed in at an emotional level with this might have said, "Oh, God, what a crappy bunch of stuff that is." And then it was disappointing when we examined the contents of the one and couldn't find those rare diatoms that were so interesting.

*Livingston:* So we'll change gears now and ask about your relationship, cooperation, et cetera, with NOAA, National Marine Sanctuaries. So first, at what point did you think about promoting Cordell Bank for conservation? How did you act on that?

*Schmieder:* In retrospect, it seems so totally natural, but I remember the instant that I heard about the sanctuary program, and I think it must have been 1980, and I was somewhere in Marin County, and I think I came somewhere either to give a talk or hear a talk. And so I was engaged, and I don't remember who it was, but I was having a bit of a conversation with somebody. I should recover that person, because it was pivotal in this.

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He remarked to me, almost quote, "Well, you know, there is a National Marine Sanctuary Program sponsored by NOAA. Do you know about that?" and my response was, "No, I don't know anything about that." He said, "Well, you might think about it.

Now, that sounds very prosaic, and in retrospect, it was. It was very, very prosaic, but I tracked after it.

Now, how would I have tracked after it? That was 1980. We weren't connected on the internet. There was no personal computers, so I guess I must have – and I just don't recall, but I must have simply called some sort of federal government directory information and looked after, tracked it until I found a Sanctuary Programs office, and I guess, sure enough, there was NOAA and a Sanctuary Programs office within NOAA.

And what must have happened, and I'm confessing I'm a little vague on the details here, but what must have happened is that I got their address, and I wrote, because that's what we did in those days. I wrote a letter, didn't even send faxes in those days. I wrote a letter to them saying, "I'm exploring Cordell Bank. It's been suggested that this might be considered as a sanctuary. Are you the right people to tell about this? Would you be interested?" or some generic stimulus like that.

What I got back – well, again, I don't remember the specifics. I remember that it was surprisingly motivating, because the response I got was, "Oh, yes, we are *very* interested in that." It was enthusiasm for that, and it was very quick, a very short time after that that we were exploring with the possibility of nominating this place to be a sanctuary.

I mean, suddenly our vocabulary changed. It was as sudden as when we discovered the holes, and we knew that we were not the first humans ever to see Cordell Bank. Suddenly, we were talking about the sanctuary, and so what I did at some point there was I assembled a short report – I think it was 15 or 20 pages – providing the basic geography as we knew it. It was called "A Preliminary Summary of Knowledge of Cordell Bank," where it is, roughly what's known about it, our species list, the dives that we've done, the history that I knew so far about Edward Cordell and so on.

And apparently it was enough to get them to respond more positively, saying, "Yes, we want to know more about this. Would you consider nominating Cordell Bank to be a sanctuary?" And

this came surprisingly quickly. I was amazed, and I felt almost a little empowered, you know. "Whoa, look, I'm affecting something."

My response, as I think I've told you, was, "No, I will not consider nominating Cordell Bank, because we don't know enough about it, and I would not want to" – what's the metaphor? Hamstring? Hogtie? Emasculate? Whatever the verb is – "any such possible nomination by having it not complete," and I was really serious about that.

So they said, "Well, okay. We'll talk to you later," and so sometime, I think, in the next year, they contacted me again and said, "Will you nominate Cordell Bank?" I said, "No, I will not. We still don't know enough," and at that point they said, "What would you need to learn enough about it to nominate it as a sanctuary?"

Well, I have to take a little credit here. I was together enough to say, "I need money. We need resources. We have so much we can do but not at zero level. If you can fund us at some level – can you?" I didn't even presume to say, "If you can." I said something like, "We would need some funding. Are you in that area? Is it possible?" or something like that.

And very quickly they picked it up, and we started negotiating. I think this must have all been done by letters and maybe some phone calls, although I'm not a telephone person. I'm a written document person. And they agreed to provide some funding for us, which they did for two years running. It was about $15,000, $17,000 each of two years, I believe, maybe $12,000 and $17,000 or something like that, which when it finally came –

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I remember – this is a little selfish. I remember feeling, "Oh, gee whiz. This isn't as much as I thought it would be." Of course, I was very grateful for it, but I worked for a – you know, I worked for a national lab, and I was used to spending big bucks to do government business, and I didn't realize that things like the Sanctuary Program are chronically strapped for money, and so I

thought in terms of government programs. And so I kind of expected maybe $75,000 or something like that.

However, it was enough to placate Breck, who had the boat, and his rising demand for more money to carry out these expeditions, and that's what enabled me to say, "Sure, Breck, we can do that." And, in addition, it provided money to buy more bottles, buy alcohol, things like that, so it really enabled us to expand and flower and, even more than that, to be successful.

We could design the project in such a way that the probability of success was much higher than what we had done before. With zero resources, you suffer a certain fraction of success. With that $15,000, $17,000 from NOAA, the success rate went way up, and that's when we were able to collect the large amounts of specimens, have successful dives, and so on, so it was very critical seen in retrospect.

*Livingston:* What was the date of that first report that you sent to them and then these subsequent grants?

*Schmieder:* Well, that had to be about 1981 or 1982, and I don't recall the exact date. It's in the documents, which are in the sanctuary office. Jenny knows exactly where those are. Whatever date I applied to that was probably the day I typed it. All those were typed on a typewriter. There was no such thing as a word processor.

*Livingston:* So who was involved from NOAA that you were corresponding with? And then if you'd continue the story.

*Schmieder:* Well, not surprisingly, I corresponded mostly with Nancy Foster, who was the Director of the Sanctuary Programs Division of NOAA, so it was her primary responsibility to manage the projected development of new sanctuaries as the sanctuary system was expanded. So I interacted with her in various ways, and she was the one, I believe, who authorized the financial support for us.

For one reason or another, I would find some excuse to be in Washington at least once a year and I always made it a policy to go

and go to visit the people in the office there, so I interacted with a bunch of staff people there whose names I don't have at this moment, but one of them was Nancy Foster. I did not see her as much as I expected to and thought maybe I should, since we were the most important project going on anywhere. You get the sarcasm? But whatever the details were that I didn't see, the project went ahead.

That is, the apparent desire, and supported actual realized desire on the part of NOAA to establish a Cordell Bank National Marine Sanctuary was there, and to my surprise, NOAA took this seriously enough to give us money to do something. I don't want to call it official, because it wasn't official yet, but we converted from being a sort of a closed group of people who were just exploring and describing with some vague concept that what we were doing was pushing back the frontiers of scientific knowledge into being part of the bureaucracy of the federal government of the United States of America and having just excavated or exhumed all of the records of Edward Cordell, the records being there because Cordell worked for the federal government.

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Suddenly, everything we did, I knew, if this ever happened, would become part of the permanent records of the federal government of the United States of America, would live forever. And so we were no longer explorers, we were part of destiny, part of history. As tiny and unimportant as all of this is, it has those labels on it, and we took that very seriously.

So, I responded as formally and as completely and as well as I could to the request from Nancy Foster and the Sanctuary Programs Division to provide them with whatever information they wanted and to do it – one of my requirements as a scientist – I am a professional scientist, I know what data means, I know how to collect it, I know how to document it and describe it. All of that skill which I used in my regular research and physics was applicable to all of this and ensured the integrity of the data that we got.

I believe that people had the confidence that we weren't over-describing or distorting the records of what we had, that it was

genuine. I think the evidence for them respecting what we were producing is that the sanctuary actually came to be, because that initial document, "A Preliminary Description of Knowledge of Cordell Bank," became the sort of core documentation for why Cordell Bank should be protected as a sanctuary. So, both – we did the best we could, and I ensured the integrity of the data. I think they accepted it on face value and properly so.

So, as time went on, to my pleasure and some surprise, there became these other activities. Now and then we would hear somebody else that we didn't already know and was not part of our group utter the words "Cordell Bank," and every time I would hear somebody else say the word "Cordell Bank," I would be amazed.

It would be an astonishment that someone else knew about it, and even in those early days I couldn't quite come to grips with the idea that anybody else would think it was important, because, after all, Cordell Bank is a little place way out of the way. Who would consider this important?

But then a big event occurred, and that was a bill was introduced in Congress to establish the Cordell Bank National Marine Sanctuary. Now, that's not the way NOAA normally did their sanctuaries. Those are established by regulation. All of the other sanctuaries to my knowledge in the system are established by regulation within NOAA, and, to my understanding, each of those could be undone if some administrator somewhere – and I'm not making light of this, I'm trying to describe what I understand is the structure – could simply delete one of those sanctuaries off of the list without too great a consequence. An Act of Congress is tougher to get around.

"Well, why did we have an Act of Congress?" I said, and the answer was, apparently, during the two terms of the Reagan administration, not a single sanctuary was designated. Somehow, the SPD of NOAA went into cold storage. Maybe you can associate it with the politics of the Republican Party or something like that. I don't know what the truth is there, but by 1988-89, there were people, and I will name them, who were getting rather irritated that there were no more sanctuaries being developed.

Well, what was available? Cordell Bank was available. It's in the pipeline. My original letter that I had written was stimulated by a direct request from – I think it was Nancy Foster, and that might have been 1983 or so. We could check the record on that, a short letter nominating, and it's a trigger to start that process. So that was five years earlier, and all that time Cordell Bank had been sitting on somebody's in-basket.

*01:05:30*

Well, Diane Feinstein, Doug Bosco, a Congressman, and the current Speaker of the House, introduced a bill in the Congress to establish the next national marine sanctuary, the Cordell Bank National Marine Sanctuary, and it was passed. And it went to the President, President George Bush, Senior, who signed it as the first environmentally oriented law in his new administration early in 1989.

The years leading up to that were for me a period of transition out of it. I not only caused myself but I watched myself kind of exit from this ownership, this total exclusive ownership of Cordell Bank. Every time I would say – in the early days, I would say "Cordell Bank" to someone, and they would respond with a blank look. I had the semi-satisfaction out of saying, "Well, Cordell Bank is a rocky bank off the coast of Point Reyes." And then as time went on, I would encounter someone that I didn't need to tell that to.

Here is an example that was both sweet and slightly bitter to me, so there is that combination. It was Maxine McCloskey who founded and ran a thing called The Whale Center in Oakland. It was an environmental activist volunteer organization. Maxine not only mastered what it was Cordell Bank was, where it is, and what it's about, but provided a lot of support and stimulation and education to people, to the public who were needed to support such a nomination to actually bring about approval of the sanctuary. After all, if the SPD threw a sanctuary party and no one had ever heard of the place before, it might have fallen flat.

So, for me personally, I watched these things happen with increasing pleasure that other people were learning about this place

and a bit of a decrease, a kind of a letdown, kind of a deflating experience that I was not the only word in town, that there was somebody else who was also worthwhile listening to about the phrase "Cordell Bank." And that process continued right up until designation. There was a still slightly bitter – not bitter. That's too hard a word, but a disappointment.

I knew in advance when the President was going to sign the bill, and one of the – somebody, I actually don't remember who it was who said, "Well, I think you should be there when he signs it." I said, "Well, yeah, actually, that's appropriate, isn't it? Gee whiz. How did this come about? This would be appropriate. The President usually has somebody ceremonially around," and until the day before, I thought I was going to be at the White House for the signing of this bill.

And then suddenly the connection seemed to break. It was sort of like a radio station going off the air or a phone clicking out. Suddenly, I couldn't get any response. I would call and leave a message, or they would say, "Well, I don't really know. Things are changing around."

I understand all of this in the sense that the President's schedule changes a lot, and they have to do things informally and quickly. I think I also understand it in terms that I was not quite as significant and important a character. By the time it got to the White House for the President to sign, my role, Bob Schmieder's role in all of this, was not terribly recognizable. That is, the Diane Feinsteins and the Barbara Boxers and so on were the personalities associated with this, and I am not ungrateful at all.

*01:10:25*

This wouldn't be a sanctuary if someone else hadn't taken it up. I was not able to make a sanctuary out of it. I was only able to nominate it and do the field work that provided the scientific justification for it, but the politics had to be done by people who carry around big political hammers.

But, for me, missing the chance to go to the White House to stand by the President of the United States as he signs this bill was a real disappointment, and I wanted that picture to take back to my team

to pay them, to reward them for what they had done. It was a small thing, and this is the only time I've ever described my own personal feeling at that. It would have been nice, but it's okay, because look what we have now, this fantastic sanctuary, and so the satisfaction is there even if this particular event was missed.

*Livingston:* Did you have any personal involvement during that period when the legislation was being prepared?

*Schmieder:* Practically not at all, and it was a bit of a surprise to me that I didn't, and part of it was my own fault for not doing anything, but, after all, I'm a scientist. I am not a politician. I don't think I would have been very good at the politics, although I was asked to come back, and I did go back to Congress, and I testified in front of the committee that evaluated and approved this nomination.

So I had a chance to play the role of a technical expert, which I did. I showed pictures and said why this should be a sanctuary, but I felt outclassed in the political arena. I didn't think I knew anything about politics, and I certainly didn't know any of the players.

To be honest, I didn't particularly want to do that. It's not my interest. My interest is the science, and I did the science well. I did it reasonably completely given the resources we had, and then my interest waned, and I got interested in going to other places, which is exactly what we did.

*Livingston:* Could you describe briefly how your book came to be?

*Schmieder:* The book originated in an idea from NOAA, and that was how to reach the public concerning a sanctuary, Cordell Bank, that was so inaccessible. So, what they proposed was that we create a book that would be distributed in public and appeal to a general reader, a general interested reader, and they approached me about the project, and I readily agreed to write the book, and it was appropriate.

And so I did, drafted the original manuscript for the book, and then over some period of time, maybe the next year or so, I think some

things changed. Perhaps priorities changed. Perhaps funding changed. I don't really know, but what came to me was that NOAA was not interested at this time in publishing this book, and they made it clear that I had complete rights to what I had written, even though originally it was done under contract, that I was free to do whatever I wanted to with the manuscript.

So I consulted with my good friend at the time and still good friend, Dan Gotshall, about what could we do with this. He supported the idea that we could turn it into a book and publish it, and so I worked for perhaps five more years in completing it, laying it out. I did the entire layout on my Macintosh computer, page layout and finding a publisher and so on and having it proofread by a whole variety of technical specialists. Paul Silva at Berkeley in particular put in extraordinary effort to make sure that every phrase, every implication of the words was correctly done, and then I published it, and now we have copies of the book.

*01:15:20*

*Livingston:* *Ecology of an Underwater Island*.

*Schmieder:* Yes. I might remark with some bragging that my younger son, Randy, who got a combined scientific illustration/biology degree from University of California, did a lot of the illustrations inside of this book as well as this cover, the color cover which, as you see, folds. The front cover and back cover fold out as one large image, and he assembled this, synthesized this from examining literally hundreds and hundreds of our underwater photographs. And it is an extraordinarily accurate representation of what we saw as divers, maybe a little more colorful than we saw it under most conditions, but it's really quite an accurate representation of what Cordell Bank actually looks like.

*Livingston:* You mentioned this while the recorder was off, so I want to get back to it. You last dived Cordell Bank in 1995, I understand.

*Schmieder:* Yes.

*Livingston:* And did you intend that to be your last dive there?

*Schmieder:* Every year that we did the diving, we would evaluate whether we were going to do it again the next year. Usually, my team said, "That's the last dive, right, Bob?" and I would say, "Yes, that's the last dive," but inevitably we would come back and do it again.

I will confess here for the first time that I lied. I never intended it to be the last dive. I always knew that from the moment, as I described it for you, from the moment I saw Cordell Bank, the first one second, I knew I would be there for ten more years, and I was. So I humored them in their last dive comments, but I knew I would carry on. It was only when it sort of became a *fait accompli* with the sanctuary that the motivation to go there tapered off, and therefore the team energy tapered off.

The return in 1995 was stimulated by some people who were very eager and very technically competent, and for me it was a chance to return after ten years to observe potential changes that had happened in the bank, but in 1995 I knew with almost certainty that I would not dive there again. The only hope that I still have is that someday I might be invited aboard a submarine so that I could go out and see it again.

*Livingston:* Good luck with that.

*Schmieder:* Thank you very much.

*Livingston:* So we've talked for quite a while here about your overall experience of diving at Cordell Bank. So how does this experience rate with other adventurous experiences you've had in your life?

*Schmieder:* Well, a distant second after meeting my wife, Kay. We'll take that as a calibration. You do understand that Cordell Bank was for about ten years an obsession. I was slave to that obsession. There was no way I could not do that. I thought about it day and night.

I was immersed in it. I pulled together and pulled along and pushed and carried the team, not unwillingly, but it was my obsessive driving interest to see this project through to what appeared by 1980-'81 to be the potential for establishment of a

national marine sanctuary. It would have been wrong to do anything else.

It was also very exciting. I want to make sure it's clear. We did not do this for the adventure. You can throw yourself out of an airplane or anything else. Walk on hot rocks if you want adventure.

We did this because we believed in the validity of the scientific pursuit. This is field science. It's not field fun. It was fun. It was adventure for us, but that was ancillary to the deeper, wider purpose, namely to document what's out there to support the rational management protection of whatever it is that's out there.

*01:20:20*

By the time it got to be the mid-eighties, I think my obsession had solidified. You know, living things calcify, and they become solids. My obsession with Cordell Bank has become a calcified, solid thing, not dead, but not going away, not diminishing, not changing, but also not an urgency. I sort of evolved into other urgencies, and we carried out a lot of expeditions to a lot of other places, but it clearly was a life – not a life-altering, a life-swamping experience for me.

*Livingston:* How does that experience influence your interests today?

*Schmieder:* Well, part of my interest is in what we're doing right here at this table at this moment, and that is capturing what it was that happened then, and for that I am deeply grateful that you have provided this opportunity, that the Sanctuary Program has underwritten this, that you're taking your time so that we can capture that, because not only does it help complete this process and because as a scientist I want this process completed, but also it's helping me to relive the excitement and the interests that we had there.

Right now in my life I'm concerned about other things. I have a startup company involving a whole new architecture for computers, nanotechnology embedded in it, so I spend a lot of my time thinking about that. We're remodeling our house, so my head is no longer filled with the details of Cordell Bank. Thankfully,

those details are in the competent hands of sanctuary managers and, I hope, some scientists who would do really good science. I will be thrilled when I see any kind of scientific reports of work or any other data.

We mentioned high resolution surveys. I don't think I've ever had the chance to look at side-scan survey data. I would love to do so, and I would actually love to be involved in research projects. I no longer have the capacity to lead or carry out – I have the capacity – I no longer have the position to carry out any kind of extensive ambitious research program, but it's right there with me every day all day.

*Livingston:* What image or thought about this experience sticks with you after all these years? Is there any one something?

*Schmieder:* As I've described before, the most intense image is that very first glimpse of Cordell Bank, October 22, 1978, when I broke through the fish and saw the place, but, of course, that image is compounded or enhanced by the extensive preparation that we had had to go through to get there. So that was partially the same exhilaration that Hillary must have felt when he summited Everest or Armstrong and Aldrin felt when they landed on the moon, and we likened ourselves to that. It was a giddy kind of a feeling. I think that will always remain the one most intense visual, psychological thing or image that stays with me.

There is, of course, Don Dvorak's famous photograph of the rosy rockfish that is reproduced on the sanctuary documents and many other places. That's an image that never goes away. It's become a semi-classic photo, if you like, and, of course, there are literally thousands and thousands of other images that are there.

*Livingston:* What do you tell your friends or family or colleagues about Cordell Bank today? For instance, how would you describe it to somebody?

*01:24:53*

*Schmieder:* I tell them that I am absolutely astonished and thrilled that there is a national marine sanctuary in really good hands and that long ago we did a project that was tough, and we were tough, and that it

doesn't always work for it to come to a good or a productive end. Sometimes, the plane crashes. Sometimes, the ship gets frozen in ice in Antarctica, and the expedition leader has to row over 1,800 miles to get his men rescued and so on.

Here, the process worked, and I was the beneficiary of a good employment situation which gave me vacation time, a sensible salary that gave me money, a great team of people that did it, and then it all resulted in what appears to be a permanent part of our historical environmental culture. That's what I tell people now about Cordell Bank.

If they care to know what's at Cordell Bank, I have a few things I can say, but what I tell my friends is how proud I am that what we did – we did something that led to something. What we did can never be undone, and we hope and believe that what is there now will never be undone, either. So we're part of history.

*Livingston:* Based on your experiences and what you saw there, what would be your biggest concerns in terms of the use and potential harm to the area?

*Schmieder:* I don't fear any harm to Cordell Bank itself. Part of it is its natural isolation, insulation, because of its remoteness. I don't think there's any threat, although I may be naïve, and I'm certainly not keeping up with the threats. I don't think there's any threat from somebody trying to drill an oil well out there. The threat of fishermen dropping their lead balls on the bank has been effectively dealt with, and I am extraordinarily pleased that they've taken that step. I advocated it in my comments on the draft management plan when the sanctuary was established, and I was not terribly popular with the fishermen, by the way, in that.

So I think that the threat is not going to be mechanical. The threat is going to be political, economic. It's going to be one of – if there is a threat, it's going to be lack of interest. There has got to be people who care about the national marine sanctuaries, just as there are people who care about the National Aerospace Museum on the Mall.

If people sort of drift away and don't – if nobody is an advocate for the sanctuary system – and they have to be smart about it, and they have to be in powerful places. It can't be just people with throwaway comments, "Oh, well, we need this nice place." It has to be people with enough clout to not only preserve the system as such but keep it growing at a sensible rate.

America is founded on sensible growth rate in everything we do, so that means funding at some appropriate level to keep staff on and the important work that Jenny does in communicating, in pulling together, codifying materials and reaching out and so on. I think that that's critical. What we're doing here today I think is part of what is necessary to keep Cordell Bank protected.

If I were to be more activist, I would say what it needs is some research funds. It needs some research programs. It needs some scientists. It's a beautiful laboratory out there. It's a little tough to get to. There's a bit too much water around it, but somebody needs to designate some funds to support somebody to do some – look at all these "somes" in here – somebody to study, say, the – say a ten-year study.

Here's an example, a ten-year semi-quantitative – it could be photographic study, using divers, of the cover. What are the plants and animals that live there? It would be – scientifically, it would be trivially simply. Mechanically, it's challenging. It's going to take resources but simply photographing what is there at known control described intervals to see what changes are happening.

*01:30:15*

Surprise is the most powerful tool of a military organization. If you want to win, surprise your enemy. If we want nature to win, let her surprise us. If we want to win, which means we want to keep on living here and live in a safe, secure, beautiful environment, we need to not let nature surprise us, and the way to prevent that is support these sanctuaries to some extent so that we can observe, collect, analyze the data, and understand what's going on there.

This, of course, is the charter and the motivation of the sanctuary and the people who run it. It's just that this has to be done, or we

run the risk that the sanctuaries will get old and dusty, and eventually they'll be moved into the hallway, and finally someone will say, "What's this for?" and they'll ship it out, well, metaphorically speaking, of course.

*Livingston:* Well, when you broke through those fish and you saw that first view of that beautiful color with the Cordell Bank, did you have any idea that this would turn into what it did, the protections, the national marine sanctuary?

*Schmieder:* I did not, because at that time I did not know a thing about the sanctuary program. I didn't learn that until 1980, but, as I've told you in a couple of ways, I knew instantly when I saw that that I would be back, that this was my own personal obsession, and I spoke, and I think I wrote that. I've written that in articles that I've published about Cordell Bank, that my obsession with, commitment to – with the knowledge that we could do it. We succeeded with the first dive. "See, we can do this," and therefore, for me, it was reflexive. "We *will* do this. One way or another, I will do this."

The arrival of the sanctuary option in our project changed the project, and I think, even though from the beginning I believed that if you go somewhere and explore someplace on earth that has never been characterized, you are guaranteed to make discoveries, discoveries never get undone. They don't get undiscovered, by and large, and forever after you are the one who did it first, and that the world has changed for having made the discovery. That was there from the beginning.

The actual embodiment of that in a working national marine sanctuary I didn't foresee, and it was only as it evolved and then when the President finally signed it and it became a reality that I drew a breath and said, "Holy smokes. This really happened," and this was a surprise and a really good one.

*Livingston:* Do you have any last thoughts as we're wrapping up here –

*Schmieder:* Probably that was my last thought on how I felt, how I felt about this, except that I will just repeat what I said a few minutes ago,

how important I think what you're doing is in this process, how effective Jenny and Dan and the rest of the staff are being, and how important you, Dewey, are in capturing this little piece of it, how important it is, because Cordell Bank is an important piece of an important chunk of an important country and an important world, and I'm thrilled to have been a part of that and to have perhaps left a footprint somewhere that might still persist long after I can no longer make any footprints.

So thank you very much for giving me the chance to share how I felt about this, what we did in some detail, but especially how I felt about this and what it meant to me and, to a great extent, to some of the other members in my group and my team. So thank you very much.

*Livingston:* You're welcome. Thanks for taking so much time with us.

*[01:34:59, end of audio file 4; end of interviews.]*